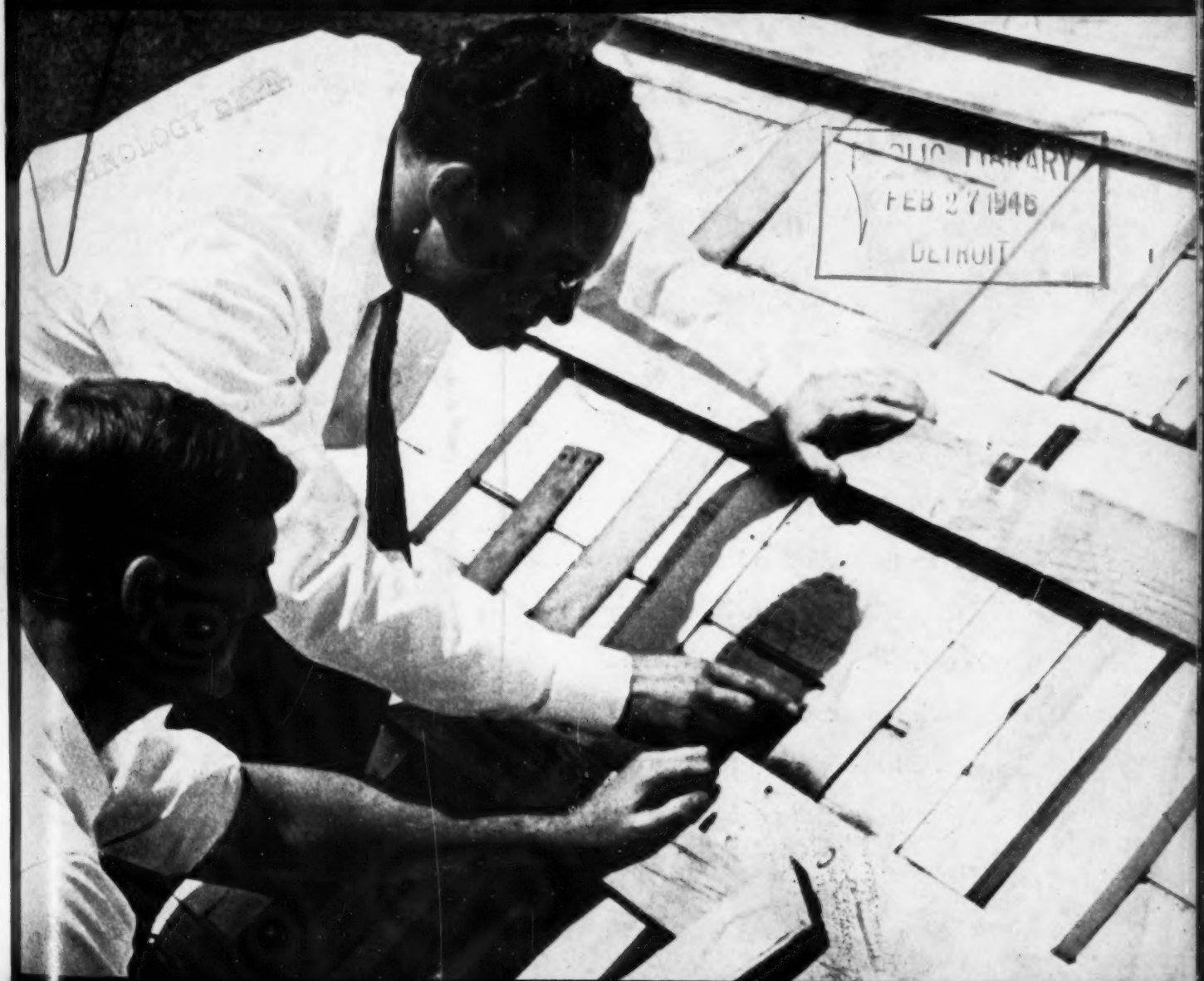
February 1946

Chemical Industries

IN THIS ISSUE



What Paint Makers Want from the Chemical Industry p. 241

IN PEACE...as in war

Soap Needs Alkalies

SODA ASH

CAUSTIC SODA

CAUSTIC POTASH

POTASSIUM CARBONATE

Soap that builds up longer-lasting suds . . . soap with new ingredients for more effective use...soap that won't jell...Out of wartime research have come new types and forms of improved soap. Basic to soap making are alkalies and related products...proving that in peace as in war alkalies are indispensable!

SOLVAY SALES CORPORATION *Alkalies and Chemical Products Manufactured by The Solvay Process Compa*

Westvaco CHEMICALS

NEW COMMERCIAL and EXPERIMENTAL PRODUCTS

PRODUCT	CHARACTERISTICS	SUGGESTED USES	AVAILABILITY
HYDROGEN BROMIDE, Anhydrous HBr	Liquified Gas HBr—99% Min. Free Br—None Water—None	Chemical Reactant; Pharmaceutical Intermediates; Bromination of Alcohols; Catalyst	Limited Commercial Quantities
HYDROBROMIC ACID 48% HBr	%HBr 47.5-48.5 Residue<.005% Colorless to faint yellow	Chemical Reactant	Limited Commercial Quantities
ALUMINUM BROMIDE, Anhydrous $AlBr_3$	Melting Point 97.5°C Soluble in most organic solvents	Catalyst in Organic Reactions	Limited Quantities
ALLYL BROMIDE $CH_2=CHCH_2Br$	Boiling Point 71°C Sp. Gr. 20/4°C 1.398	Introduction of Allyl Group into Organic Compounds	Research Quantities
CHLORAL, STABILIZED CCl_3CHO	Sp. Gr. 25/4°C 1.50 to 1.52 Assay—95 to 96%	Aldehyde Condensation Reactions; Insecticide Mfg.	Limited Quantities
BUTYL CHLORAL $CH_3CHClCCl_2CHO$	Sp. Gr. 25/4°C 1.385 to 1.405 Assay—95% Min.	Aldehyde Condensation Reactions	Limited Commercial Quantities
STRONTIUM HYDRATE $Sr(OH)_2 \cdot 8H_2O$	Assay—95.0%	Soaps; Ceramics; Greases	Commercial Quantities
GRANULAR MAGNESOL* Percolant Grade	Adsorptive Synthetic Magnesium Silicate	Oil Purification; Adsorption; Decolorization	Limited Commercial Quantities
GRANULAR MAGNESOL* Desiccant Grade	Adsorptive Synthetic Magnesium Silicate	Desiccant; Catalyst; Catalyst Carrier	Limited Commercial Quantities

*TM Reg. U.S. Pat. Off.

Production can be increased within a reasonable time on any of the above items.

WESTVACO CHLORINE PRODUCTS CORPORATION

405 LEXINGTON AVENUE - NEW YORK 17, N. Y.

CHICAGO, ILL. GREENVILLE, S. C. NEWARK, CALIF.

we don't want to be CAUSTIC about caustic...

NO! That's the last thing we want to be accused of...and, to avoid any such possible criticism, we're laying the cards on the table — face up.

Sure, Caustic is still short — and it's likely to be for an indefinite time. (We only wish we were making more!) Now *we* produce high quality Caustic — Rayon Grade. As is well known, certain consumers can use only the purer grades of Caustic Soda. We've been delivering the highest quality Caustic during the critical war years. The important thing has been to produce and deliver against commitments. This we have done.

Today, it's still a question of supply and demand and frankly, we are unable to supply all the consumers who would like to use Mathieson quality Caustic. But we are confident that we will again be able to take care of the requirements of those to whom we have committed ourselves.

THE MATHIESON ALKALI WORKS (Inc.)
60 East 42nd Street • New York 17, N. Y.

Mathieson
CHEMICALS

CAUSTIC SODA : : : SODA ASH : . . LIQUID CHLORINE . . . BICARBONATE OF SODA . . . CHLORINE DIOXIDE : : . AMMONIA, ANHYDROUS & AQUA . . . HTH PRODUCTS . . . FUSED ALKALI PRODUCTS SYNTHETIC SALT CAKE : : . DRY ICE . . . CARBONIC GAS . . . SODIUM CHLORITE PRODUCTS . . . SODIUM METHYLATE

THE CHEMICAL BUSINESS MAGAZINE

Chemical Industries

VOLUME 58
NUMBER 2

February 1946 Contents

DEPARTMENTS

NEWS OF THE MONTH

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THE READER WRITES

Toward Industrial Peace

To the Editor of Chemical Industries:

Your editorial "Toward Labor Peace" is very thought provoking and timely.

During the war I served as a Government Labor Officer, and in this position was in a place to observe and advise with many CWS contractors on their industrial relations problems. In so many instances I was amazed at the weak, inadequate personnel and industrial relations staffs of some of the companies. A strong industrial relations director with authority can save a company from much fight and grief. Just why some companies build strong sales and production staffs and not strong personnel ones I do not understand.

A READER

Release of Technical Men

To the Editor of Chemical Industries:

Your editorial entitled "Technical Manpower Still Wanted" in the December 1945 issue of CHEMICAL INDUSTRIES was read with much interest. As pointed out, the technical manpower problem, with particular reference to the chemical industry, is of major concern at this time.

In the fourth paragraph of this editorial, the following appears:

> "Those who have served in technical capacities in the *Army or Navy* would be particularly valuable to industry at this moment. Many such men now seem to have little more to do than sit and twiddle their thumbs while waiting for their discharge points to accumulate, despite provisions 'whereby men may be discharged when it can be clearly shown that their services would be of more value to the national interest in civilian status than as soldiers.' Perhaps industry may be partially at fault here for not putting forth greater effort to get these men."

Our experience coincides with the point raised by you relative to obtaining release of technical men *from the Army* where their services in chemical industry can be shown to be of more value to the national interest in civilian status than as soldiers. We have not found this to be true in case of technical men now *in the Navy*.

We would appreciate your advice relative to any special means that can now be used in obtaining release of qualified technical personnel from the Navy on the same basis, as above indicated for the Army. Our recent experience has shown that only where personal hardship is involved or sufficient points have been accumulated, is it possible to obtain release from the Navy. In most cases with young technical men in the Navy, hardship cases cannot be clearly established and except in a few cases of married men with many years of naval service have sufficient points been accumulated by regular Navy officer personnel.

Any suggestions in this regard will be of help to us.

S. C. OGBURN, JR., Manager
Research and Development Dept.
The Pennsylvania Salt Mfg. Co.
Philadelphia, Pa.

Although it is more difficult to get a man released from the Navy than from the Army, it is understood that a few such releases are being granted where a man possesses special or unusual skills that are badly needed in essential civilian activities. All requests for releases should be presented in writing by the employer to the Chief of Naval Personnel, Navy Department, Washington, D. C. Each case is acted upon individually, and decisions are said to be based on evidence of need for the man in question and the degree to which his special skills are being used, or may be used, in the Navy. Number of discharge points already accumulated by the man is also taken into consideration.
—EDITOR

Classification System for Chemical Market Data

To the Editor of Chemical Industries:

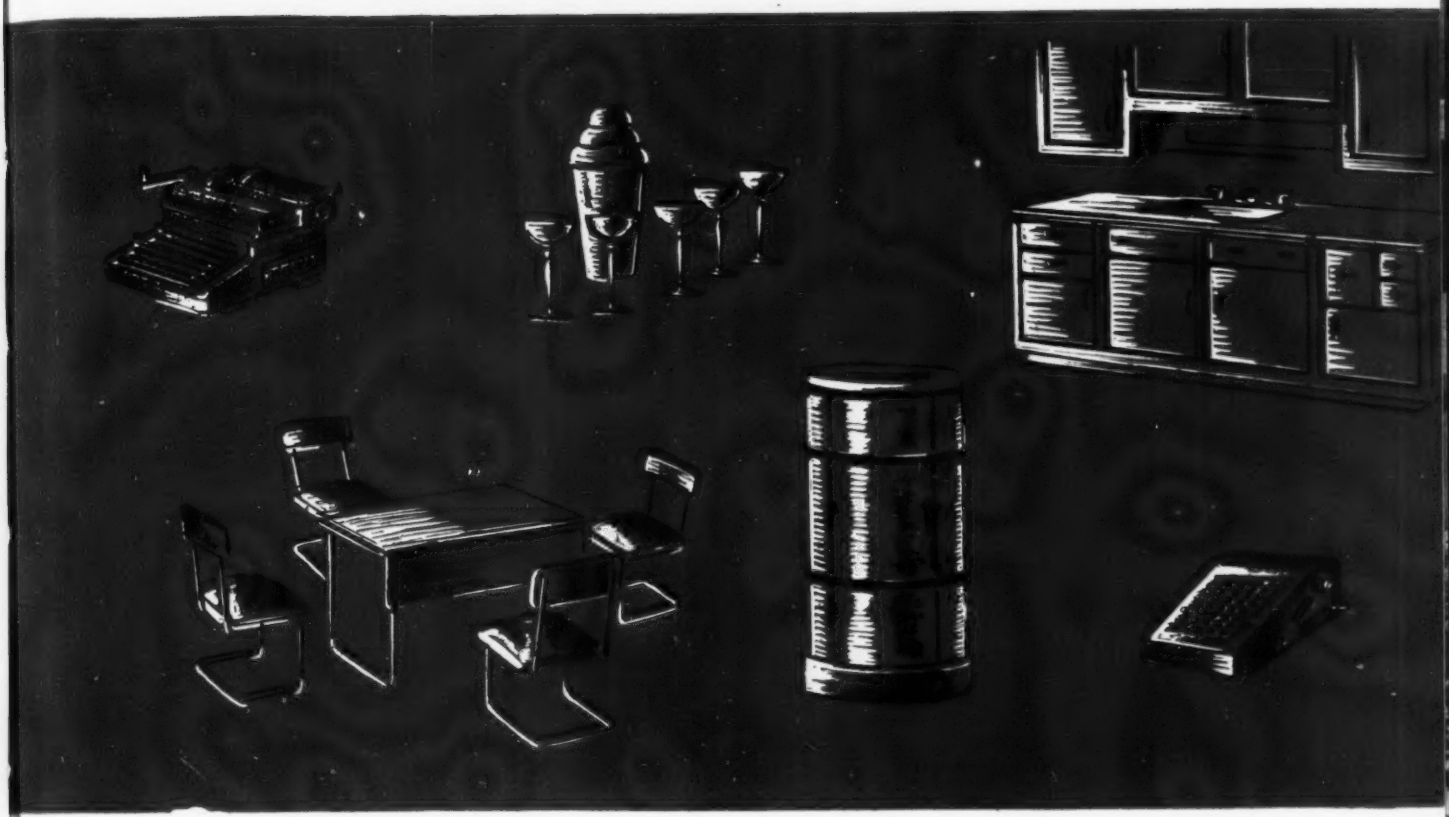
I was delighted with Mr. Richard M. Lawrence's article on chemical market research data sources in your December issue. Our department here is rapidly expanding and calling for all sorts of help. There is an immediate need that we cannot fill, and that is a ready made subject heading list to use in building our files. Even if one could get a good basic list that would lend itself to expansion in the subjects of interest in the particular industry concerned, it would help. The Library of Congress has such a list but I have never found it too practical. Therefore I wish one of your series on *Information Sources for Chemical Market Research* would be on how to organize the information, once it is gathered, and to include a basic subject heading list with a typical breakdown for one industry which would serve as a pattern for others.

IRENE M. STRIEBY, Librarian
Eli Lilly and Co.
Indianapolis 6, Ind.

If there are sufficient seconds to Miss Strieby's suggestion, perhaps CHEMICAL INDUSTRIES *could find someone to undertake the job.*—EDITOR.

Chromic Acid

MAKES LIFE MORE COLORFUL



This life of ours becomes more colorful every day—thanks to chromic acid. Gone from home, office and industry are drab grays and lifeless shades. In their place is colorful aluminum and its alloys—plentiful, popular and versatile. Now, by anodizing aluminum with chromic acid, it can be dyed to a finish that is attractive, durable and desirable for many applications.

For instance, aluminum typewriters, adding machines, tables, chairs—even cocktail sets—are but a few of the many appointments that may be anodized with chromic acid and dyed any one of a variety of colors.

In the home, too, aluminum equipment may be harmonized with the color scheme by this interesting and efficient process.

A full description of methods for producing chromic acid anodic coatings on aluminum, developed in the laboratories of Mutual, is given in our booklet, "Anodizing Aluminum by the Chromic Acid Process," which you may have upon request. Literature on dyeing methods is also available.

Mutual Chromic Acid is widely used in many industries because it is always the same high quality product. It meets all specifications. Shipments of chromium chemicals are made from either of our complete plants or dealers' warehouses throughout the country.

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Madison Avenue, New York City

Please send me the following Mutual Booklets:

nodizing Aluminum by the Chromic Acid Process
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romate Corrosion Inhibitors in Bimetallic Systems
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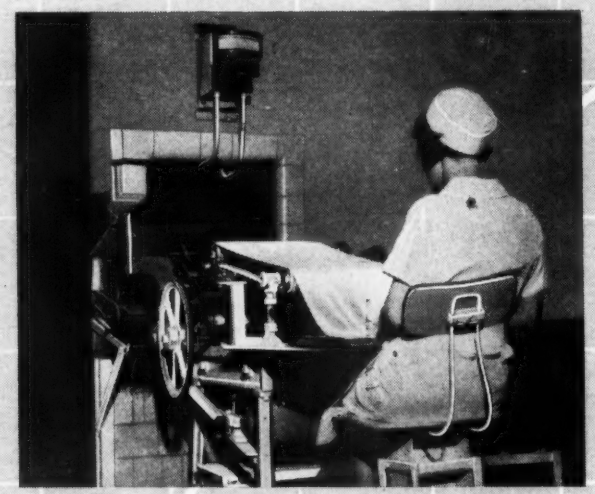
MUTUAL CHEMICAL CO. OF AMERICA — OVER A CENTURY OF CHROMIUM CHEMICAL PROGRESS

Mutual

CHROMIUM CHEMICALS

Dowtherm on the job!



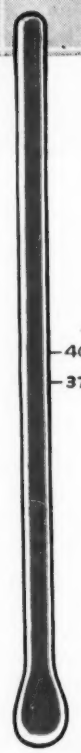
"French-frying" demands Dowtherm's disciplined heat!

Keeping high temperatures from running wild . . . that's *the* tough problem for many a heat processor! It confronted this big manufacturer eight years ago, in conjunction with "French-frying" a food product . . . a delicate operation, absolutely dependent upon careful temperature control.

His solution? A Dowtherm vapor heating unit . . . still in dependable operation today . . . still giving the even, "disciplined" heat (375°-400° F.) necessary to prevent ruining of batches from overheating or underheating. One of the company officials says this about Dowtherm:

> "*We put it in because it was the only process which would give us the control in our cooking oil that we required. Since that time, we have been more than pleased with its operation; and if and when additional expansion on this particular unit is contemplated, it most certainly will be Dowtherm heated.*"

Dowtherm is handling difficult jobs like this for many industries. Hundreds of users depend on Dowtherm's precise, low-pressure operation for greater product uniformity . . . reduced upkeep costs . . . increased safety in high-temperature processing up to 725° F. Check Dowtherm against *your* heating problems! Dow will be glad to send you full details.



Dowtherm

The high-temperature low-pressure heat transfer medium

DOW
CHEMICALS
INDISPENSABLE TO INDUSTRY

THE DOW CHEMICAL COMPANY, MIDLAND, MICHIGAN

New York • Boston • Philadelphia • Washington • Cleveland • Detroit
Chicago • St. Louis • Houston • San Francisco • Los Angeles • Seattle

WASHINGTON

T. N. SANDIFER *reporting*

No "Surplus" Patents . . . Helium Welding . . . Crude Rubber Prices

ICC Amendments . . . Surplus Chemicals

Congress Resumes Work

CONGRESS IS RESUMING its work in the midst of unprecedented national turmoil, and at this stage the betting is about even as to whether anything very effective is going to be accomplished in remedying the situation.

In some cases the crux is in the inability of a major industry to meet current labor demands under OPA price controls, with OPA reluctant to change its policy, even though, as in the steel wage controversy, it was given a "directive" to do something.

So pressing is the national situation that current opinion here leans to the view that not much attention will be accorded a great many bills that loomed important at the beginning of the recess, a number of which involved radical changes of policy. Some of these deal with patents, others with major decisions involving disposal of surplus property, such as the pipelines and the Government's aviation gasoline plants, among others.

In the pipeline matter, it was thought that Congress might of necessity intervene, when a majority of the petroleum industry indicated its opposition to the Surplus Property Administration recommendation that the two major pipelines be continued in transportation of oil.

As a corollary, Washington industry men have been watching with some puzzlement the tactics of the Federal Power Commission, which appears to have decided that the current upset conditions call for it to assume more authority than it has hitherto conceded it held.

Patent Legislation

SENATOR KILGORE, shortly before the holiday recess, introduced the bill S. 1720, the joint work of himself, Senators Johnson, Pepper, Fulbright, and Saltonstall, "to secure the national defense, promote the national health and welfare, etc.," which does not convey the real purpose of the bill at all. It embodies a number of features of earlier patent legislation left at various stages of passage in Congress.

Meanwhile, industry members are watching the Boykin bill, H.R. 4079, which contains a provision for seizure of patents which may have been acquired by United States interests from foreign sources between September 8, 1939 and December 7, 1941.

No Government "Surplus Patents"

THE SURPLUS PROPERTY ADMINISTRATION has reported to Congress, as a result of a canvass of the chief patent-owning agencies of the Government, that "replies received from each of these agencies indicate that none has in its possession any patents, processes, techniques, or inventions surplus to its needs and responsibilities. Each agency has stated that it has no intention to declare any of this property surplus."

The agencies canvassed and thus reported on, include the War and Navy Departments, Interior Department, Agriculture Department, Commerce Department, Federal Security Agency, T V A, and Alien Property Custodian.

The War Department suggested that before any other Government-owned patent is declared surplus it be offered to various departments, and the Navy suggested that some such patents might be used in a trade to obtain release from the Government from claims of infringement of other patents.

Interior indicates it is very interested in the patents held by the Alien Property Custodian which affect the liquid synthetic fuels program now under way at the Bureau of Mines.

Pressure Welding Using Helium or Hydrogen

THE OFFICE OF PRODUCTION RESEARCH AND DEVELOPMENT has rendered an encouraging report on its experiments with new pressure welding processes of alloy steels, using helium, or a reducing gas, such as hydrogen.

The purpose of using these gases, it is explained, is to exclude the oxygen and oxides which are among the main causes of inconsistent weld strength. Through the use of these protective gases, weld strength was found to be appreciably increased. The tests were conducted at Battelle Memorial Institute, Columbus, O.

Canadian-U.S. War Industry Pooling Report

A FEATURE OF THE REPORT by the United States section of the Joint War Production Committee, of which William Batt served as chairman, deals with the collaborative effort of scientists of the two countries in production of RDX, a particularly deadly explosive which enemy countries had attempted to manufacture at the expense of repeatedly blowing up their plants.

Similar cooperation aided in production of rocket cordite, methods of filling heavy shells, and manufacture of flashless propellants, greatly sought by American European battle commanders.

Surplus Chemicals

RECENT SURPLUS SALES PLANS announced cover 1,304,000 gallons of high-grade aviation motor oil; 328,000 pounds of aluminum soap grease declared surplus at Chicago; a chemical plant at East Rochester that made filter blocks for synthetic rubber manufacture, placed on sale; and a Government-owned oxygen plant at Brooklyn, N. Y., placed on sale.

The RFC has reported a total $28,460,000 of surplus chemicals on hand, at reported cost, with sales to date totaling $3,947,000 cost, for a sales realization of $2,446,000.

Chemical Wood Prices Increased

PRICES OF CHEMICAL CORDWOOD in Michigan, Wisconsin and Minnesota were increased through OPA action by 11 percent to offset an advance in wage rates in the Lake States logging and lumber industries.

Private Tank Car Ownership Gains

BETWEEN 1939 AND 1944 industry ownership of tank cars increased 2.3 percent in number, compared to a gain of 1.6 per-

cent in railroad-owned cars, it is reported by the Interstate Commerce Commission.

Tank cars, it is found, are largely provided by the using industries, with a total gain of 1,102 tank cars installed by all owners in the years surveyed, compared with 869 retired. The largest turnover occurred in 1942, it was found.

Crude Rubber Prices Still Uncertain

THE PRICE on the first postwar shipment of crude natural rubber to be received in this country cannot be determined until conclusion of negotiations between the RFC and the governments of the rubber-producing areas, the RFC has announced.

The agency has denied reports that it paid 34 cents per pound for the 8,000 tons comprising the cargo. The shipment was collected largely in Malaya and Java.

Amended ICC Regulations

THE INTERSTATE COMMERCE COMMISSION plans to expedite action on the numerous applications for amending the regulations governing transportation of explosives and other dangerous freight.

Some of the changes sought include: addition of fluorine, pyroxylin cement, hydrofluoric and sulfuric acids, mixtures of these acids, and phosphorous sesquisulfide to the list of explosives and other dangerous articles.

These are only a few of the changes involved. However, it has been found by ICC that the industry and the agency have had an extensive discussion of many of the more important amendments, so that it is believed possible to move the proceedings up.

Rosin Quotas to Continue

PRESENT QUOTAS ON ROSIN USERS will be maintained at least during the first quarter, 1946, it has been decided. Production figures to date are said to indicate that the combined output of gum and wood rosin during the current naval stores year will be nearly 80,000 drums below the figure under which present quotas were established. Besides, it was revealed recently, export quotas have been increased by 87,000 drums. There is accordingly a net reduction of approximately 167,000 drums in the available supply for domestic users.

Production for the 1945-46 crop year is estimated at 1,400,000 drums.

Chemical Freight Rates Attacked

A NUMBER OF CHEMICALS SHIPPERS in separate actions have alleged excessive rates on the chemicals and products shipped by them over various railroads and other transportation, before the I.C.C. recently.

Among others the following are noted: Davison Chemical Corporation, Baltimore, and International Minerals and Chemicals Corporation, Chicago, complaints against numerous major railroads alleging unreasonable rates on phosphate rock from Florida; Naturogas, Inc., Minneapolis, complaints against 16 railroads alleging excessive charges on liquefied petroleum gas shipments; also among complaints is that of an Indianapolis municipal utility charging excessive rates on this gas; carriers in Illinois and Western trunkline territory have applied to I.C.C. for relief from present rate restrictions on shipments of hexylene glycol in carloads from points in southwestern U.S. to Illinois.

Basic Magnesium Facilities Being Disposed Of

ALREADY AN EXCELLENT START toward reconversion of the magnesium plant formerly operated by Basic Magnesium, Inc., at Henderson, Nev., is reported by the Reconstruction Finance Corporation.

Three chemical firms are stated to have leased space and are operating these facilities. Several other companies have indicated a desire to lease or buy other space in the nine manufacturing buildings, the RFC added.

Involved in the disposal plan are these nine buildings, which are identical, and some 5,000 square feet of space in a tenth, partly occupied by a chemical concern now operating these reconverted facilities. The plant was launched in the war to produce metallic magnesium, magnesium alloys and such byproducts as caustic soda, chlorine and fluxes.

Scarce Chemicals Being Released

EIGHT LARGE LOTS OF CHEMICALS, some of which have been scarce, were put on the market at the year-end as Government-owned surplus. The lots include acetone, aniline, dibutylphthalate, dimethylaniline, dinitrotoluene, ferrous chloride crystals, phthalic anhydride and anhydrous sodium sulphite, all of which were acquired for use at the Alabama Ordnance Works, Sylacauga, Ala. They enter such products as dyes and intermediates, explosives, lubricating agents, plastics and many others.

Carbon Black Rates Hearing

THE INTERSTATE COMMERCE COMMISSION, on application by a number of carriers, has set February 6 for a hearing at St. Louis to establish rates on carbon blacks in carloads from producing points in Kansas, Oklahoma, Louisiana, New Mexico and Texas, to Topeka, Kans.

(Continued on page 279)

ADVENTURES IN THE "MARGIN OF EXPERIENCE"

Ceramics +

Number 3 in a Series depicting the industries served by the products of Niagara . . . "An Essential Part of America's Great Chemical Enterprise".

AN ANCIENT ART REVITALIZED

Typical of the older industries that are developing long-latent possibilities in their products is the ceramic industry. Through research and the use of new production techniques, leaders in this industry are constantly improving the quality utility of such materials as tile, porcelain, stoneware, earthenware and chinaware.

Outstanding among these advancements is the application of one-coat porcelain enamels for steel...the use of ceramics in battery housings...the development of colorful and decorative tiles for roofs and loadbearing walls...special insulating materials for electrical equipment...improved linings for chemical producing equipment and furnaces.

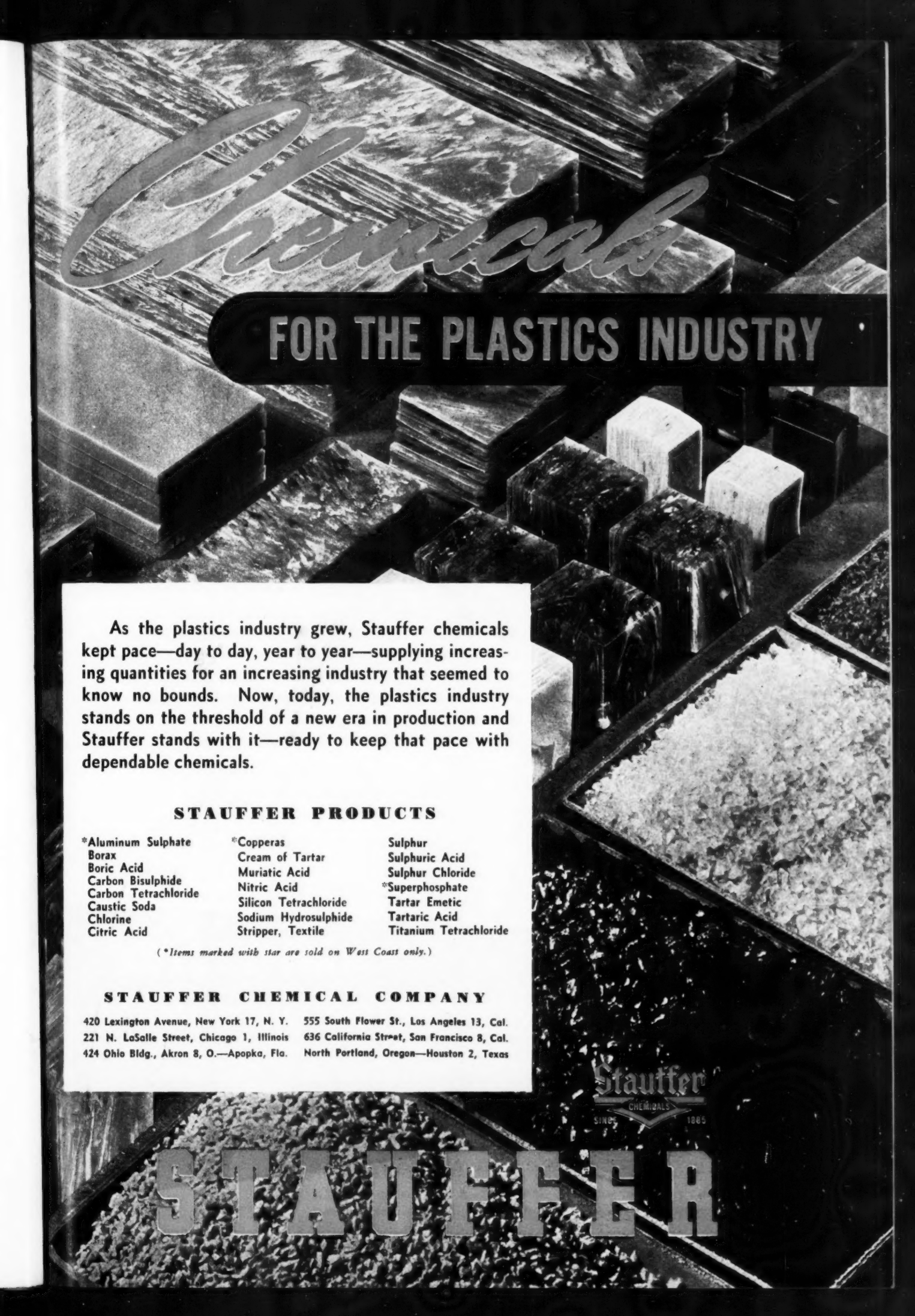
But these are not all due to research—many were made possible because of the broad "Margin of Experience" provided by years of ceramic history. It is just such a margin of experience Niagara Alkali Company, long a pioneer in the field of electro-chemical products, offers to the customers it serves.

Niagara ALKALI COMPANY

60 EAST 42ND STREET, NEW YORK 17, N. Y.

Caustic Potash • Caustic Soda • Paradichlorobenzene
Carbonate of Potash • Liquid Chlorine • Nialhal

An Essential Part of America's Great Chemical Enterprise



As the plastics industry grew, Stauffer chemicals kept pace—day to day, year to year—supplying increasing quantities for an increasing industry that seemed to know no bounds. Now, today, the plastics industry stands on the threshold of a new era in production and Stauffer stands with it—ready to keep that pace with dependable chemicals.

STAUFFER PRODUCTS

*Aluminum Sulphate	*Copperas	Sulphur
Borax	Cream of Tartar	Sulphuric Acid
Boric Acid	Muriatic Acid	Sulphur Chloride
Carbon Bisulphide	Nitric Acid	*Superphosphate
Carbon Tetrachloride	Silicon Tetrachloride	Tartar Emetic
Caustic Soda	Sodium Hydrosulphide	Tartaric Acid
Chlorine	Stripper, Textile	Titanium Tetrachloride
Citric Acid		

(*Items marked with star are sold on West Coast only.)

STAUFFER CHEMICAL COMPANY

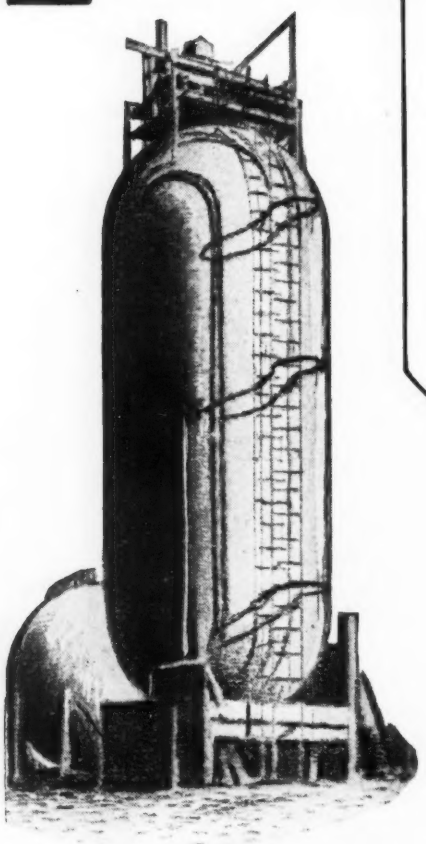
420 Lexington Avenue, New York 17, N. Y.
221 N. LaSalle Street, Chicago 1, Illinois
424 Ohio Bldg., Akron 8, O.—Apopka, Fla.
555 South Flower St., Los Angeles 13, Cal.
636 California Street, San Francisco 8, Cal.
North Portland, Oregon—Houston 2, Texas

Stauffer CHEMICALS SINCE 1885

STAUFFER

FROM THE CATALOG OF

BARRETT BASIC CHEMICALS...



CYCLOHEXANONE

A water-white ketone with exceptional solvent power. The industrial application of cyclohexanone is based largely on its powerful solvent action for a wide variety of materials including crude rubber, some of the synthetic elastomers, natural and synthetic resins and gums, cellulose ethers and esters, and especially for many vinyl chloride polymers and copolymers.

SPECIFIC GRAVITY: 0.941 to 0.945 at 25°C/15.5°C

REFRACTIVE INDEX: 1.446 to 1.451 at 25°C

DISTILLATION RANGE: 5% to 95%; 2.5°, including 155.6°C

COLOR: Water White

ACIDITY: Neutral

EFFECT ON METALS: Non-corrosive

RESIDUE FROM EVAPORATION: None

FLASH POINT (Approximate): 47°C (116.6°F)

SOLUBILITY IN WATER (Approximate): 8-9% at 20°C

CONTAINERS: Tank cars, 50-55 gallon non-returnable steel barrels and small containers.

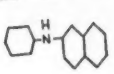
THE BARRETT DIVISION
ALLIED CHEMICAL & DYE CORPORATION
40 Rector Street, New York 6, N. Y.

In Canada: The Barrett Company, Ltd., 5551 St. Hubert Street, Montreal, Que.

Barrett

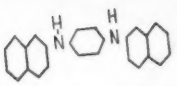
B. F. Goodrich Chemical Company

has available for sale these organic chemicals



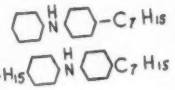
Phenyl B Naphthyl Amine

Distilled—Available in commercial quantities
M. P. 107°
Purity 99.5%
Commercial—Available in commercial quantities
M. P. 106°
Purity 98.0%



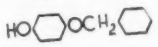
Di B Naphthyl p Phenylene Diamine

Available in commercial quantities
M. P. 230° C
Purity 98%



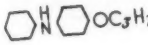
Mixed Mono-and Diheptyl Diphenyl Amines

Available in commercial quantities
Distillation range—145-245
(3.0 mm)
Purity 98%



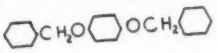
Monobenzyl Ether of Hydroquinone

Available in commercial quantities
M. P. 113°
Purity 90%



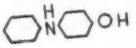
Isopropoxy Diphenyl Amine

Available in commercial quantities
M. P. 78°
Purity 92% min.



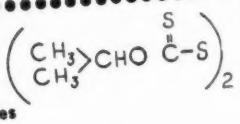
Dibenzyl Ether of Hydroquinone

Available in Pilot Plant quantities
M. P. 119°
Purity 85%



p Hydroxy Diphenyl Amine

Available in commercial quantities
M. P. 150
Purity 92%

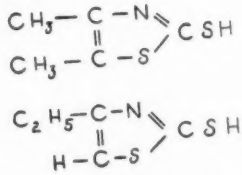


Di Isopropyl Dixanthogen

Available in commercial quantities
M. P. 52°
Purity 98%

N-Nitroso Diphenyl Amine

Available in commercial quantities
M. P. 62°
Purity 97%

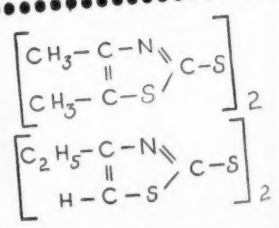


Mixed Ethyl and Dimethyl Mercaptothiazoles

Available in commercial quantities
M. P. 136-153°
Purity Approximately 85% dimethyl and 15% ethyl mercaptothiazoles

Diphenyl p Phenylene Diamine

Available in commercial quantities
M. P. 144°
Purity 92%

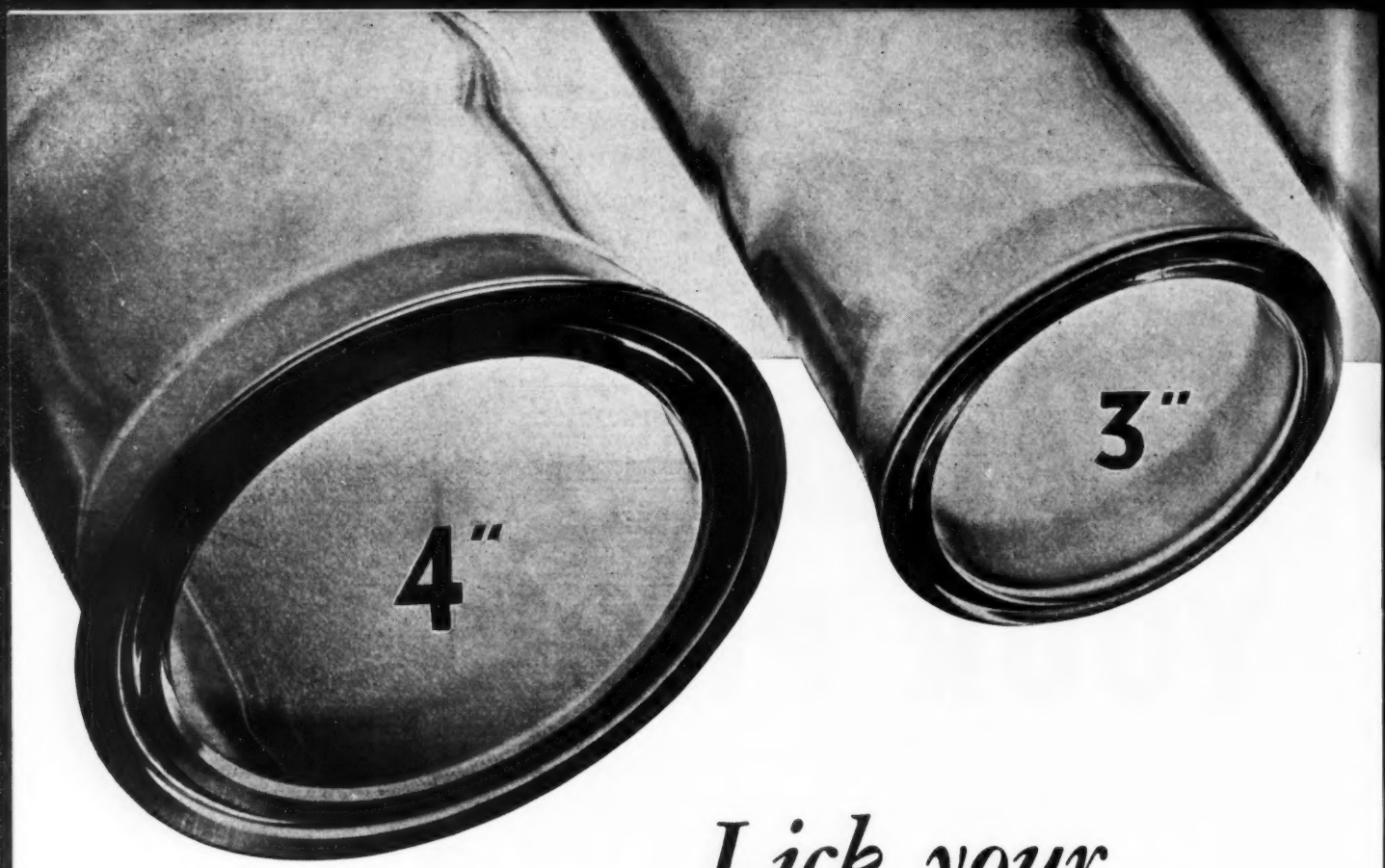


Mixed Aliphatic Thiazyl Disulfides

Available in commercial quantities
Liquid

For additional information please write B. F. Goodrich Chemical Company, Department CD-2, Rose Building, Cleveland 15, Ohio.

B. F. Goodrich Chemical Company A DIVISION OF THE B. F. GOODRICH COMPANY

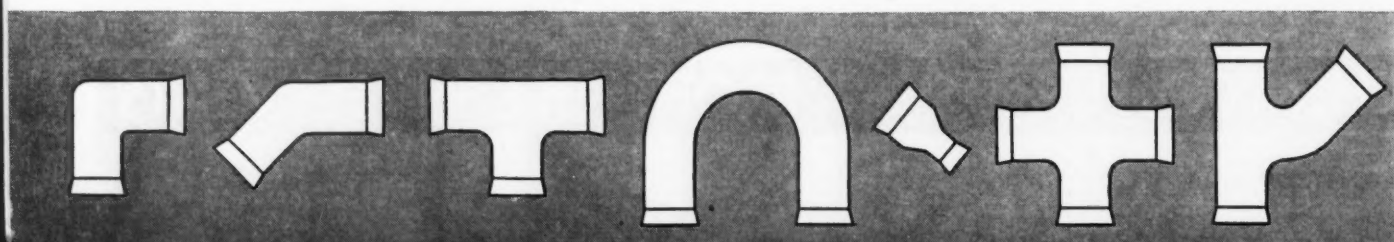


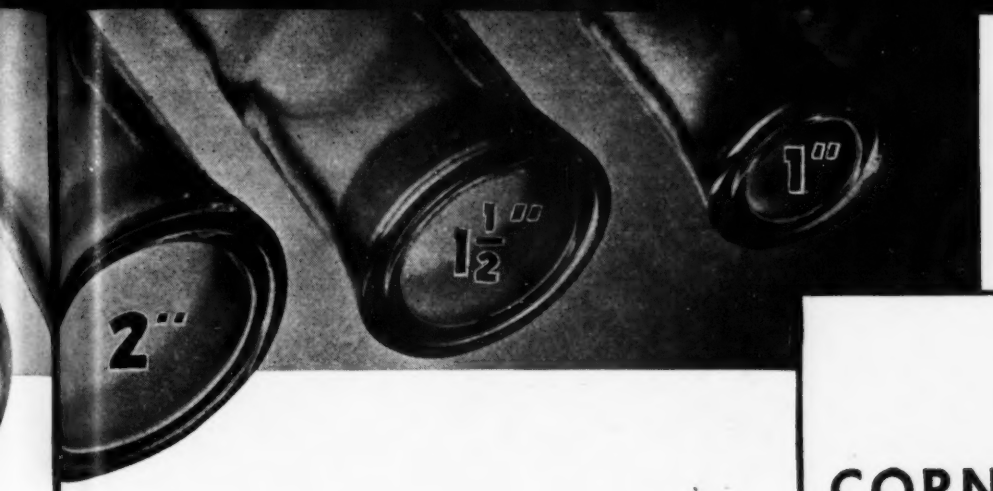
Lick your Corrosion Problems and Maintain Product Purity with

GLASS PIPE

You can install PYREX brand Glass Pipe Lines with complete confidence that they will stand up under actual plant operating conditions. Their sturdiness and serviceability have been proved by installations that have been in operation in process industry plants for many years.

If your present pipe lines need frequent replacement because of chemical attack, if product purity is a factor, if visual inspection of your pipe lines and their contents would be helpful, you can profit materially by installing PYREX Pipe. It will prove to be a very profitable investment.





AVAILABLE IN SIZES FROM 1" TO 4" I.D.

See the

CORNING EXHIBIT

BOOTHS
Nos. 332
333 346 347

at the Chemical Show

PYREX PIPE AND FITTINGS

Ease of Installation—Your own men can install a PYREX brand Glass Pipe Line. No special tools or special training are required. The pipe, the fittings and the hardware come to your installation point ready for assembly. There's no cutting to lengths, no threading necessary on the job. Stock adaptor flanges are available to connect PYREX Pipe to metal pipe and other plant equipment.

Sizes and Fittings—PYREX Brand Glass Pipe is now available in 1", 1½", 2", 3" and 4" i.d. A complete line of standard PYREX fittings includes ells, tees, return bends, laterals, and reducers. Special fittings can be readily made to your specifications.

Pressures and Temperatures—Operating temperatures as high as 250°F. are not unusual—and temperatures as high as 400°F. can be considered. Most installations operate at pressures up to 50 p.s.i.—but pressures as high as 100 p.s.i. can be considered.

Visibility—The crystal clear transparency of PYREX pipe permits visual inspection of every foot of your pipe line at any time. This feature serves to forewarn you of unexpected trouble in your pipe lines. In some cases it has saved the entire amount of the investment in PYREX Pipe in a single instance.

Low Cost—The initial cost of PYREX Pipe (accessories included) is about the same or less than the cost of full weight copper or brass piping in comparable sizes, and is considerably less than the cost of most other corrosion resistant alloys. Whether you figure costs of new equipment in terms of initial outlay or in terms of over-all costs—spread over the length of service it will give you—PYREX Pipe is your best bet.

Maintaining Product Purity—PYREX Pipe is resistant to all acids (except HF) and moderate alkalis. There is no heavy metal pick-up or danger of metallic contamination. PYREX Pipe lines assure the ultimate in obtaining product purity.

Corning Engineers will gladly cooperate in applying it to your particular requirements. Write to the Industrial Sales Dept. CI-2, Corning Glass Works, Corning, N. Y.

CORNING GLASS WORKS
CORNING, NEW YORK

GLASS PIPE

AND INDICATES MANUFACTURE BY CORNING GLASS WORKS, CORNING, NEW YORK

INDUSTRIAL SALES DEPT., CI-2,
Corning Glass Works, Corning, New York

Please send me IA-1 "PYREX Pipe" for the Process Industry

Name..... Title.....
Firm.....
Address.....

With Chopin — It's "Savoir Faire"
With NUCHAR — It's "Know How"

Yes, *"Know How"* is important with NUCHAR, too. Years of manufacturing and marketing experience have given the makers of NUCHAR this *"Know How"* — which is yours for the asking through our technical service department.

In evaluating the use of activated carbon for your process, the technician first determines the maximum improvement which is possible. This is accomplished by using an excessive dosage of activated carbon.

Economies must then be considered in order to arrive at the optimum carbon dosage. The technician must take into consideration enhanced market value of the treated product and compare this with treatment costs.

All this, however, is just the beginning of the technician's work. Many other factors may play a very important part in determining the best treatment conditions. Some factors which may require detailed study and *"Know How"* are type of solvent, pH, time of treatment, temperature, as well as the proper quality of activated carbon to be used.

No one quality of NUCHAR activated carbon will meet the varied needs of industry. As a result, NUCHAR is produced and offered in a number of standard qualities for a wide range of specifications and in special qualities for specific problems. Write today for information and samples for your process.

Nuchar Activated Carbons ★ Abietic Acid ★ Snow Top Precipitated Calcium Carbonate ★ Liquid Caustic Soda ★ Chlorine Indulin (Lignin) ★ Liqro Crude Tall Oil ★ Indusoil Distilled Tall Oil ★ Tall Oil Pitch ★ Sulphate Wood Turpentine

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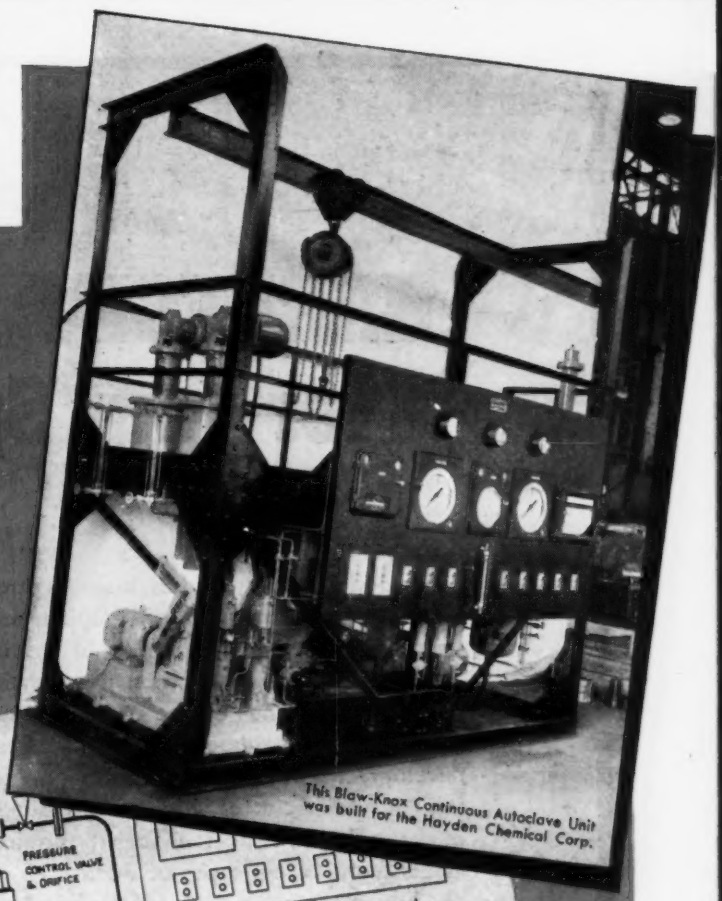
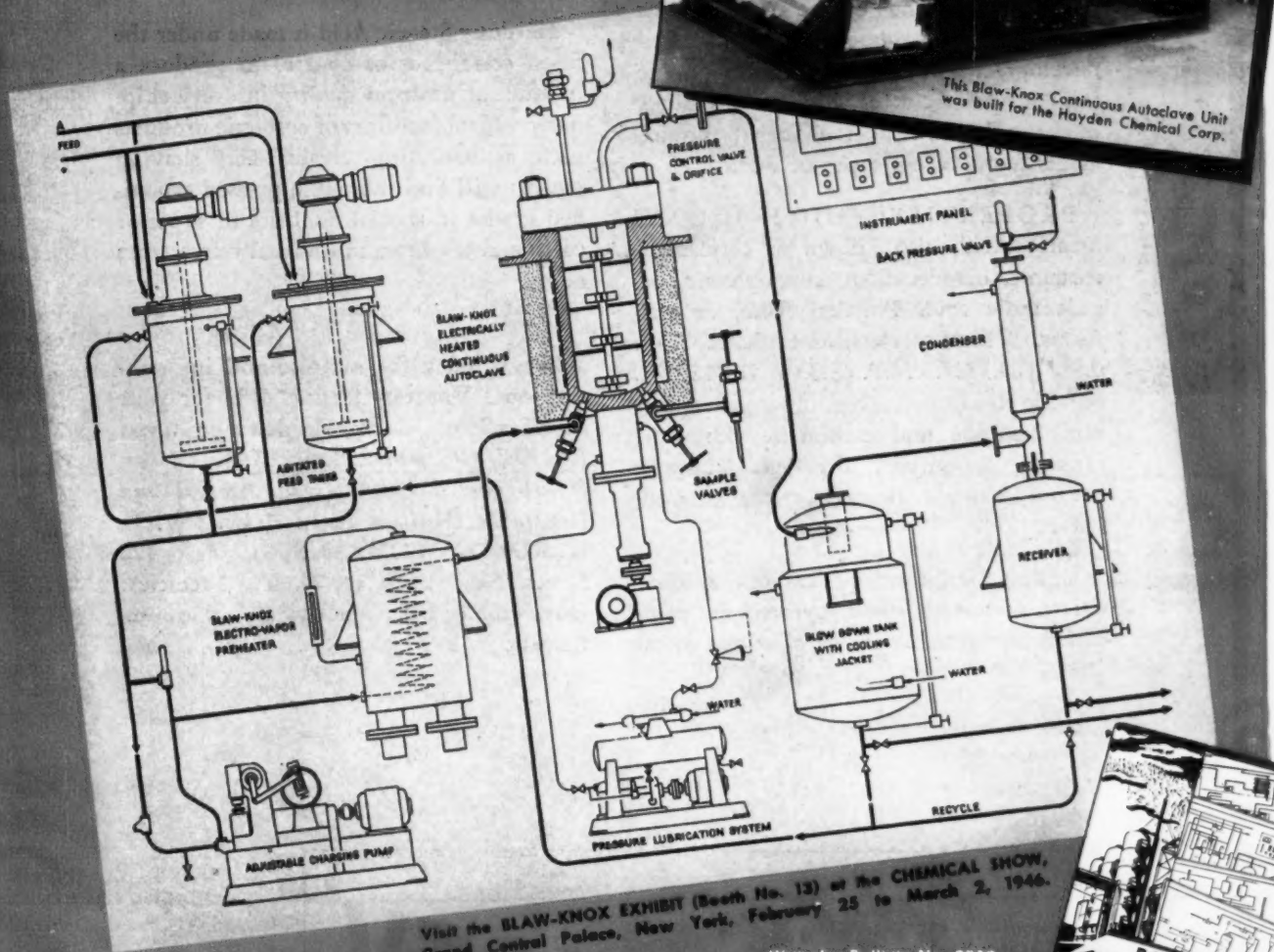
CONTINUOUS AUTOCLAVE SYSTEMS

Continuous reaction systems have revolutionized many processes. New economies and greatly increased production have been effected. Blaw-Knox equipment and Blaw-Knox engineering have had a large part in the change-overs to continuous autoclave systems.



This Blaw-Knox Continuous Autoclave Unit was built for the Hayden Chemical Corp.



Visit the BLAW-KNOX EXHIBIT (Booth No. 13) at the CHEMICAL SHOW, Grand Central Palace, New York, February 25 to March 2, 1946.

Write for Bulletin No. 2050 on Blaw-Knox Equipment and Complete Plants for the Process Industries.

BLAW-KNOX DIVISION
OF THE BLAW-KNOX COMPANY
2093 FARMERS BANK BLDG., PITTSBURGH 22, PA.
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BLAW-KNOX PROCESS EQUIPMENT

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PROPERTIES: $CH_3(CH_2)_{16}COOH$ Stearic Acid, also known as cetylacetic, stearinic, octodecylic-n, stearophanic, octodecanoic acid. Powder, flake, or slab forms. White odorless, amorphous. S.G. 0.847 (69.3°C). M.P. 69.3°C. B.P. 291°C. Soluble in alcohol, ether, chloroform, carbon bisulfide and carbon tetrachloride. Grades: Saponified, distilled, single pressed, double pressed, triple pressed, U.S.P.

USES: Manufacture stearates, stearate driers, cosmetics, soaps, pyrotechnic compositions, varnish, candles, shoe and metal polishes, pharmaceuticals, in rubber compounding as softener, activator of acidic accelerators, dispersing agent for carbon black, etc.

Hardesty Stearic Acid is made under the finest conditions of control to produce a product of uniform quality in every shipment. Manufacturers of cosmetic products such as vanishing creams and shaving creams will find the triple pressed saponified grades in special qualities of superior color and texture and unusually free from odors.

Write today for samples and information on a Hardesty Stearic Acid for your specifications. Other Hardesty products: *Red Oil, Glycerine, Pitch, White Oleine, Hydrogenated Fatty Acids, Animal and Vegetable Distilled Fatty Acids.* W. C. HARDESTY COMPANY, 41 East 42d Street, New York 17, N. Y. Factories: Dover, Ohio; Los Angeles, Calif.; Toronto, Canada.

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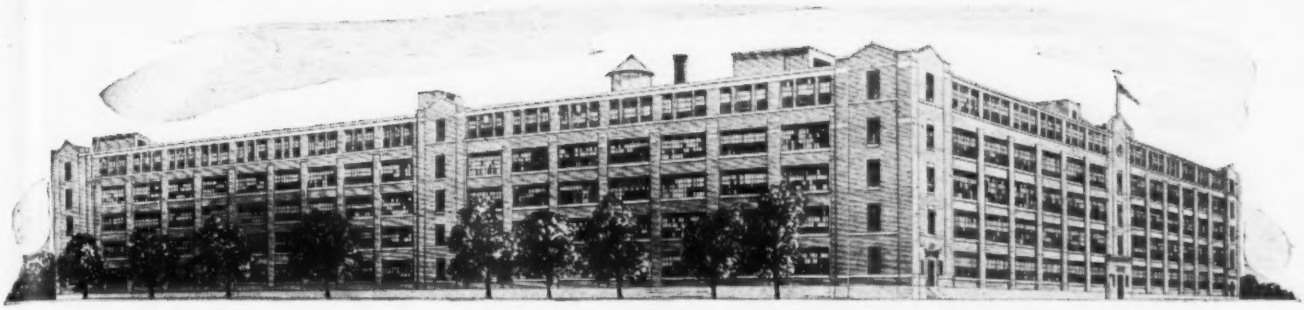

NO. 5 OF A SERIES OF DIGEST REPORTS FROM CYANAMID RESEARCH LABORATORIES

INTRODUCING TWO CHEMICAL DEVELOPMENTS THAT OFFER INTERESTING OPPORTUNITIES FOR SYNTHESIS

Newly available, AERO Glycolonitrile and AERO Lactonitrile, α-hydroxy nitriles, recommend themselves as intermediates in the production of pharmaceuticals, dyestuffs, plasticizers, solvents, and a variety of other interesting products.

AERO Glycolonitrile, marketed as a stabilized 50% aqueous solution, is a useful intermediate for synthesizing such potentially valuable compounds as:

Glycinonitrile and Glycine—the latter, an amino acid which is used as a dyestuff intermediate, a base for pharmaceutical preparations, and as an ingredient of certain animal feeds.

Alkali Glycolates—these show promise as softeners for textiles, leather, paper, and plastics.

Glycolic acid—a condensing agent and an intermediate in the preparation of shellac substitutes.

Chloroacetonitrile, Cyanomethyl Amines and substituted Amines, Cyanomethyl Chloroformate—for organic synthesis.

ALPHA-HYDROXY NITRILES

AERO* GLYCOLONITRILE $HO\text{-}CH_2\text{-}CN$

AERO LACTONITRILE $CH_3\text{-}CHOH\text{-}CN$

AERO Lactonitrile is useful for:

The synthesis of such compounds as α-cyanoethyl acetate and carbonate, α-chloropropionitrile, substituted lactic acids and lactates.

Increasing the enzyme activity of urease.

Your inquiries for further technical information and research samples are invited. Address American Cyanamid and Chemical Corp., Synthetic Organic Chemicals Dept., 30 Rockefeller Plaza, New York 20, N. Y.

	AERO Glycolonitrile		AERO Lactonitrile
	Anhydrous	50% Aqueous Soln.	
Formula	$HO\text{-}CH_2\text{-}CN$	$HO\text{-}CH_2\text{-}CN$	$CH_3\text{-}CHOH\text{-}CN$
Form	Colorless, oily liquid	Colorless soln.	Colorless, oily liquid
B.P.	183°C (sl decomp)		182-4°C (sl decomp)
Solubility	Sol water, EtOH, ether; insol C_6H_6, $CHCl_3$, CS_2		Sol water, common org. solvents; insol pet ether, CS_2
Sp. Gr.	1.104 at 19°/4°C.	1.042 at 20°/4°C	0.9919 at 18.4°/4°C.
Pounds per gallon	9.2	8.7	8.3
pH		ca 2.8	

*Reg. U. S. Pat. Off.

OTHER ORGANIC NITROGEN COMPOUNDS NEWLY RELEASED BY CYANAMID

ACRYLONITRILE $CH_2=CHCN$

ETHYLENE CYANOHYDRIN $HO\text{-}CH_2CH_2\text{-}CN$

GUANIDINE DERIVATIVES $H_2NC(:NH)NH_2$

GUANYLUREA DERIVATIVES $H_2NC(:NH)NHC(:O)NH_2$

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American CYANAMID & Chemical Corporation

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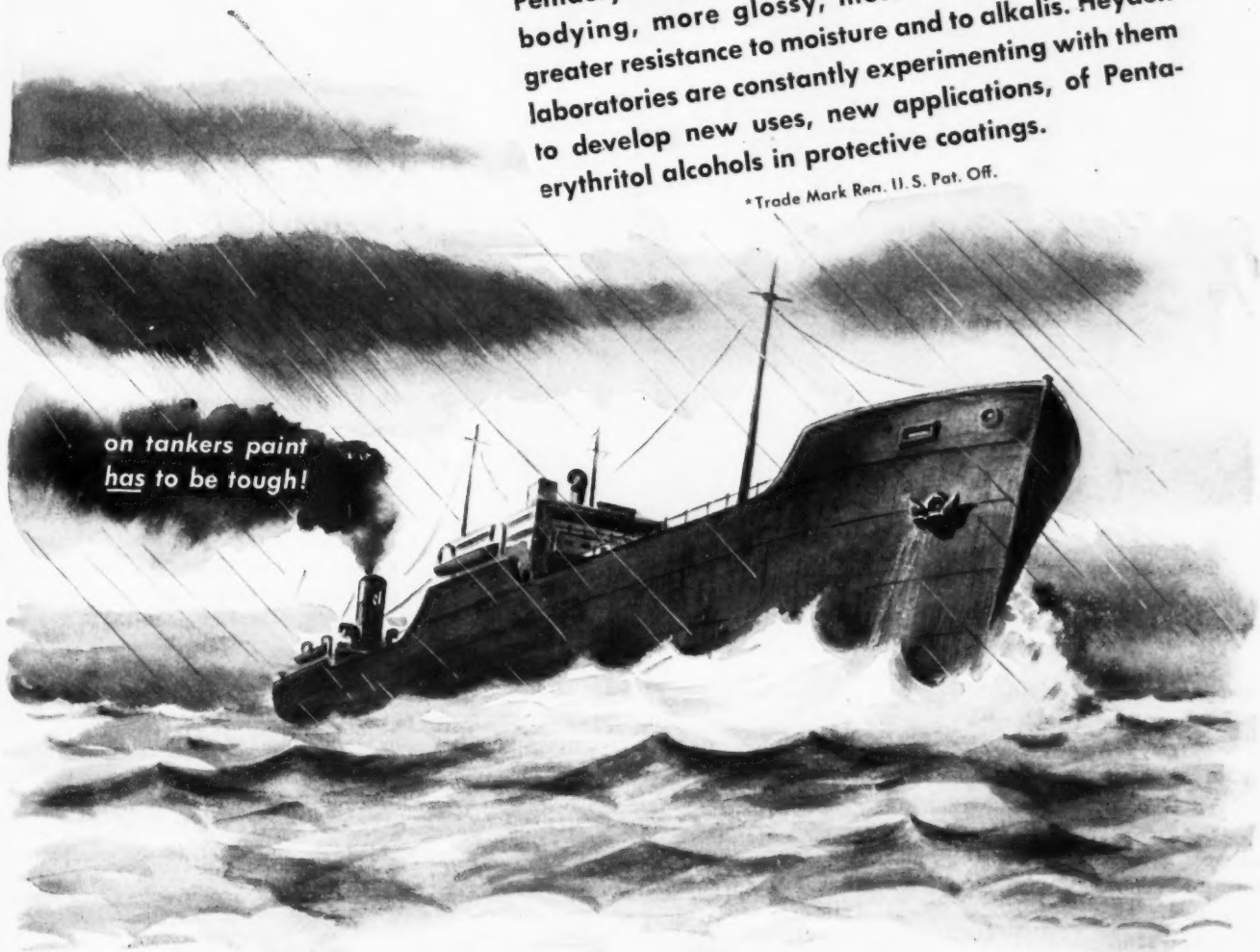
Paint and varnish coatings, processed with Pentaerythritol alcohols, are faster drying, quicker bodying, more glossy, more durable and have greater resistance to moisture and to alkalis. Heyden laboratories are constantly experimenting with them to develop new uses, new applications, of Pentaerythritol alcohols in protective coatings.

*Trade Mark Reg. U. S. Pat. Off.



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HEYDEN *Chemical Corporation*

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Here are properties that serve efficiently and economically in cleaners, adhesives, binders, coagulating agents, deflocculants, paint vehicles, sizes, coatings, gels, colloids, sols. Whatever your problem in any of these industrial processes, consult us. Our silicate knowledge has been accumulating for almost a century.

Sodium Silicate ***(liquid, powdered)*** —33 brands range from $Na_2O \cdot 1.6SiO_2$ to $Na_2O \cdot 3.9SiO_2$. The most siliceous grade (ratio 1:3.9) is S Brand, of interest for the manufacture of cements and in beater sizing of paper. The purest of silicates is Star (ratio 1:2.50); widely used for stabilizing bleaching solutions. Hydrated siliceous powders also available—G Brand, ratio 1:3.22, and GC Brand, ratio 1:2.00.

Potassium Silicate—For liquid soaps or other special soaps, for non-blooming films, for welding rods potassium silicates are used. Kasil #1, molecular ratio 1:3.9, 29.0° Baumé; Kasil #6, molecular ratio 1:3.29, 40.5° Baumé.

Sodium Metasilicate—$Na_2SiO_3 \cdot 5H_2O$, Metso Granular (U. S. Pat. 1898707). Unique detergent characteristics fast wetting, neutralizing, emulsifying, deflocculating, prevention of dirt redeposition. Popular as an alkaline cleaner in laundering and industrial processes.

Sodium Sesquisilicate — $Na_3H \cdot SiO_4 \cdot 5H_2O$, Metso 99 (U. S. Pats. 1948730, 2145749). Metso 99 not only supplies vigorous alkaline power, but its soluble silica also contributes special properties. Used for industrial cleaning such as textiles and metals.

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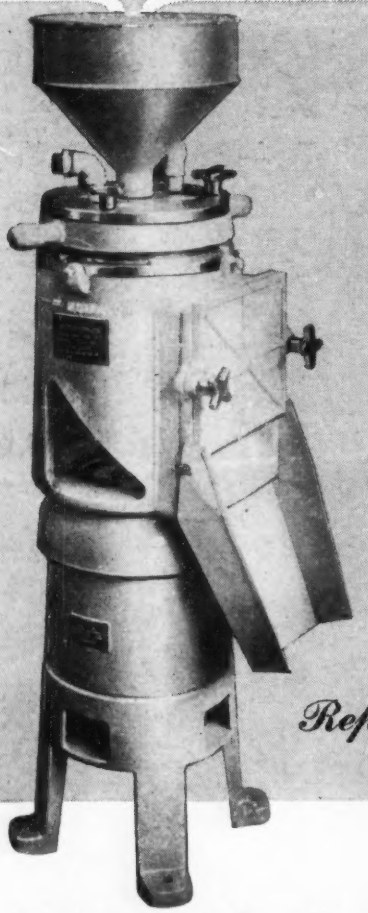
THE DOOR TO EFFICIENCY



SANITARY HOMOGENIZING EMULSIFYING DISPERSING GRINDING

Increased Production at Lower Costs

Definite Product Improvements are Reported by **PREMIER COLLOID MILL** *users*

"Definitely improved both quality and life of our product" . . . "Increased production 15% without added labor" . . . "Greater capacity per HP consumption" . . . "Test samples superior" . . . "We no longer have packing-gland trouble or product contamination" . . . "No internal corrugations to cause unsanitary conditions". These actual quotations are typical of performance reports from users of Premier Colloid Mills.

Whether the work to be done is emulsifying, dispersing or disintegrating . . . whether the material to be processed is liquid, paste or solid, every Premier installation proves itself by giving consistently successful results. Finer particle size is an important factor in finer products. Moreover, compulsory treatment of every particle assures uniform standards of quality. A partial list of fields which benefited from these results:—

Adhesives, sealing compounds; asphalt emulsions; ceramic colors; coating and waterproofing emulsions; cosmetics; foods and beverages; oil emulsions; inks; leather finishes; latex (synthetic and natural); lacquer emulsions; lubricating oils, greases; pigment dispersions; organic chemical dispersions; paints, lacquers, varnishes; paper coatings, fillers, waterproofing; pharmaceuticals; plastics, resins; polishes, waxes; rubber compounds; textile finishes. (Special laboratory models are available for research work.)

Where a new process is involved and performance data desired, a test run may be arranged. Premier Mill Corporation, Factory and Laboratory, Geneva, N. Y.; General Sales Offices, 110 East 42nd Street, New York 17, N. Y.

Descriptive Literature on Request

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Better products more profitably processed

You don't have to start your syntheses from "coal, air and water." If your synthesis involves any of these structures, you can save yourself many process steps by consulting Mallinckrodt. Compounds of these families, among others, are available now for investigational purposes.

Particulars will be gladly furnished

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79 Years of Service — *to Chemical Users*

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UNIFORM • DEPENDABLE • PURITY

See us at the Show

Booth 54—20th Exposition of Chemical Industries

Twenty years ago, the Powell Special Design and Alloy Valve Division was established and today Powell leadership in the field of corrosion resistant flow control equipment is recognized throughout the country. Because of our specially adapted designs and by far the greatest choice of metals and alloys* ever used in making valves, the Chemical Industries now look to Powell for the solution of their corrosion problems.

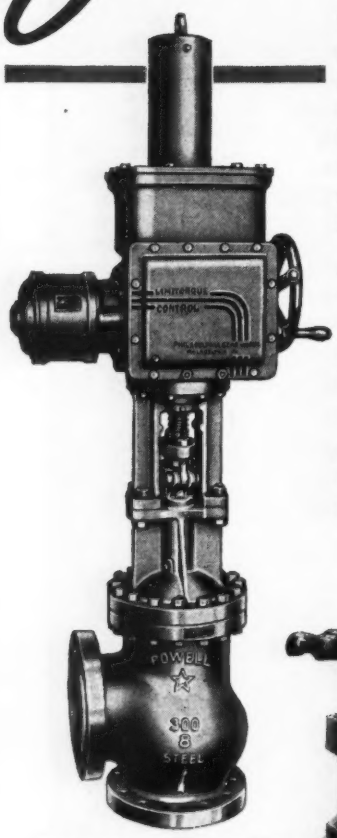
And with this important addition to the Powell Line which includes Bronze, Iron and Steel Valves of all required types, designs, sizes and pressures, the prestige of Powell Valves in the Chemical and Process Industries is easily understood.

The various Powell Valves you'll see in Booth 54 were not made for Show purposes—they're just attending the Show before they start their long careers in the service of American Industry.

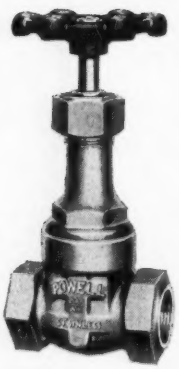
Ask for our new booklet "Powell Valves for Corrosion Resistance"

The Wm. Powell Co., Cincinnati 22, Ohio

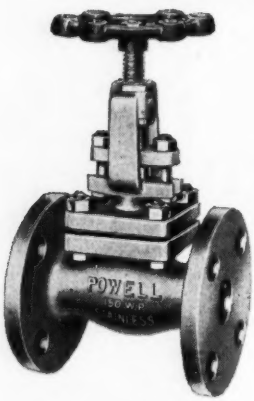
150-pound Flush Bottom Tank Valve with Powell Patented Seat Wiper. Disc rises into tank to open.



300-pound Angle Valve with top-mounted Limitorque Motor Operator.

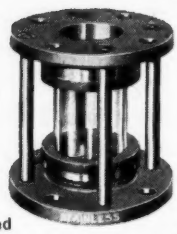


200-pound Gate Valve with screwed-in bonnet.

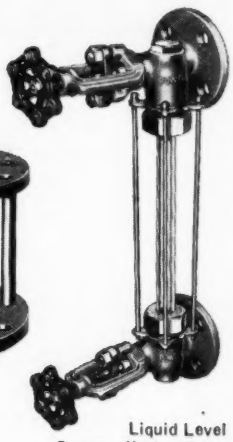


150-pound O. S. & Y. Globe Valve.

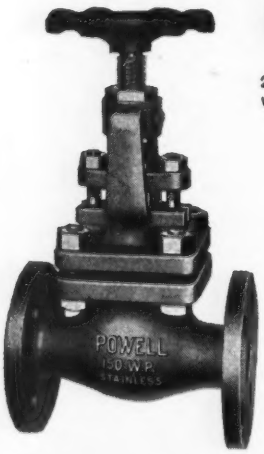
Needle Globe Valve.



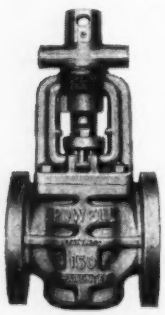
Glass Sight Feed



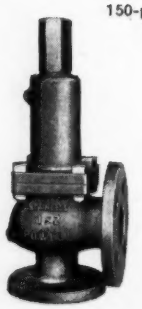
Liquid Level Gauge, offset pattern.



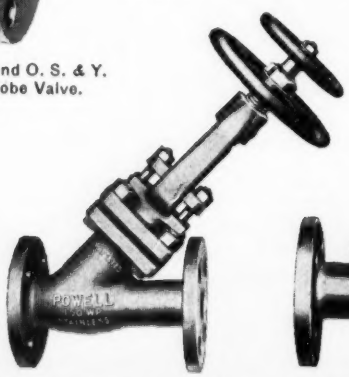
150-pound O. S. & Y. Gate Valve.



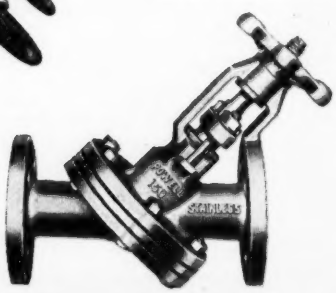
150-pound Straight-way Mechanical Lift Plug Cock.



Angle Relief Valve.



150-pound O. S. & Y. "Y" Valve with Powell Patented Seat Wiper.

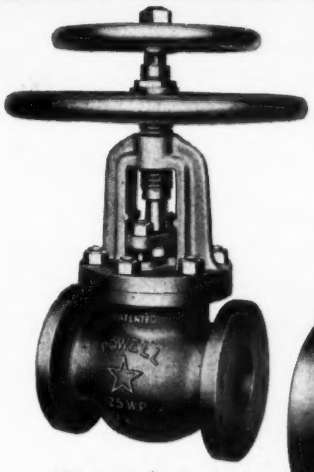


150-pound Separable Body, Reversible Seat, "Y" Valve.

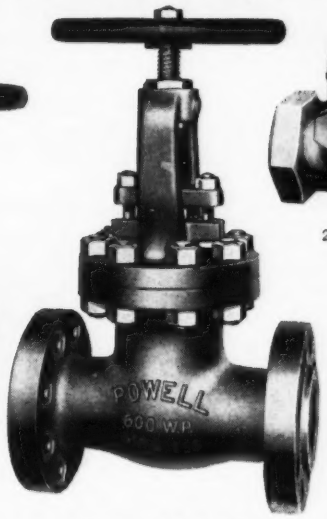
POWELL

POWELL VALVES

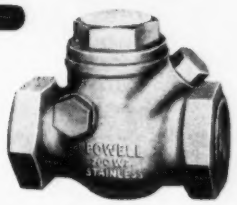
for Corrosion Resistance



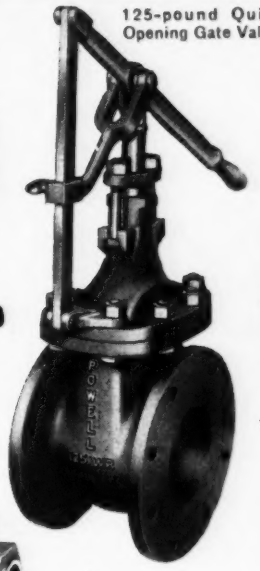
125-pound O. S. & Y. Globe Valve with Powell Patented Seat Wiper.



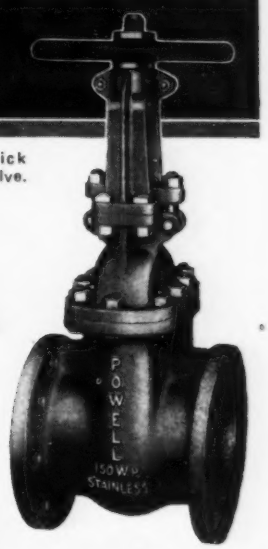
600-pound O. S. & Y. Gate Valve.



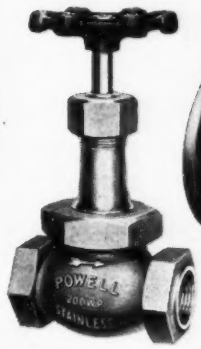
200-pound Swing Check Valve.



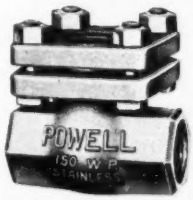
125-pound Quick Opening Gate Valve.



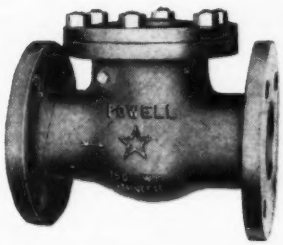
150-pound O. S. & Y. Gate Valve.



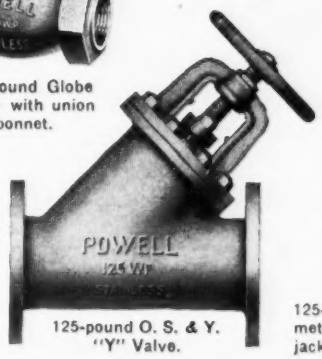
200-pound Globe Valve with union bonnet.



150-pound Horizontal Lift Check Valve.

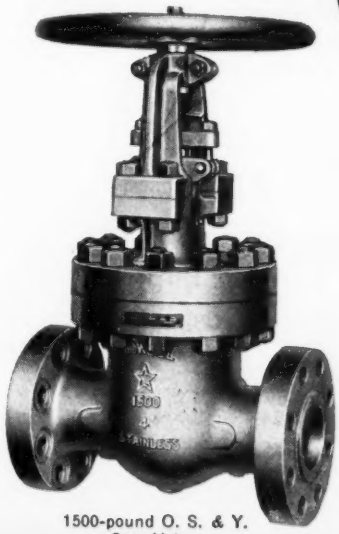


150-pound Swing Check Valve

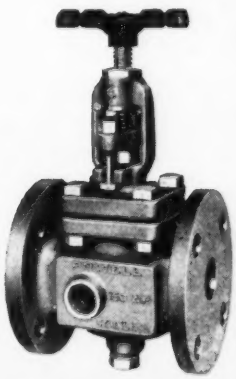


125-pound O. S. & Y. "Y" Valve.

125-pound Flush Bottom Tank Valve for metal tanks and autoclaves with steam jackets. Disc lowers into valve to open.



1500-pound O. S. & Y. Gate Valve.



150-pound Steam Jacketed Globe Valve.

***Powell Valves for Corrosion Resistance are available in the following Pure Metals and Special Alloys.**

Acid Bronzes	Hastelloy Alloys "A", "B", "C" and "D"	Silver (Pure)
All Iron		4-6% Ch. .5 Mo. Steel
Aluminum	Herculoy	18-8S
Aluminum Bronze	Inconel*	18-8S Mo.
Ampco Metal	Illium	11.5-13.5% Ch. Iron
Carbon Steel	Misco "C"	18% Ch. Iron
Durimet "T", "20"	Monel Metal*	28% Ch. Iron
D-10	Nickel (Pure)	25% Ch. 12% Ni. Alloy Steel
Everdur	Nickel Iron	
Hard Lead	Ni-resist*	

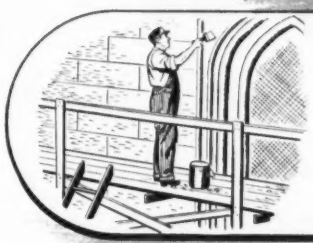
*Registered trade-names of the International Nickel Co., Inc.

VALVES

Ethyl silicate 40 is a polymer of tetraethyl orthosilicate with an available silica content of approximately 40 per cent. It is a light-brown, mild-odored liquid which undergoes the hydrolysis, dehydration, and polymerization reactions characteristic of the monomer, but which deposits silica at only half the cost.

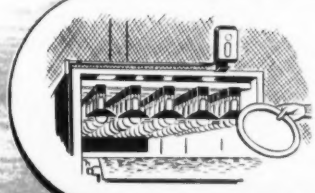
This convenient, more economical source of adhesive silica is now available in drums and in tank cars. A few suggested applications are illustrated below:

Now you can get silica-depositing solutions at lower cost with *ethyl silicate 40*



BUILDING PRESERVATIVES

Ethyl silicate 40 solutions are useful for preserving architectural and artistic stonework. The hydrolyzed ester arrests spalling and cracking due to weathering.



HEAT-RESISTANT SURFACE COATINGS

Ethyl silicate 40 paints are extremely resistant to high temperatures and to most chemicals. They are particularly useful for infrared lamps, asbestos blocks, and other surfaces where lack of flexibility is not a deterrent.

REFRACTORY BINDER

Ethyl silicate 40 is an important binder for refractory materials such as alumina, powdered silica, zirconia, and graphite.

STABLE GELS

Ethyl silicate 40 is a versatile gelling agent for many liquids including ethanol, isopropanol, and acetone. The gels are tough, elastic, and stable.

For information on the use of ethyl silicate 40, write for Form 6221.

CARBIDE AND CARBON CHEMICALS CORPORATION

Unit of Union Carbide and Carbon Corporation

UCC

30 East 42nd Street, New York 17, N. Y.

SHARPLES

Monobutylamine

$CH_3\ CH_2\ CH_2\ CH_2\ NH_2$

During the war, Sharples was able to supply Butylamines and other synthetic organic chemicals in quantities sufficient to meet the most urgent demands. Monobutylamine was one of the items high up on the critical list but now that conditions have changed and raw materials are more readily available, this versatile chemical can be produced in volumes adequate to satisfy many new requirements.

Monobutylamine will undergo condensation with many other organic compounds to form products that are useful in surface coatings, plastics, rubber chemicals, petroleum chemicals, pharmaceuticals and insecticides. The properties and specifications listed below may suggest additional applications:

SHARPLES TRADE MARK CHEMICALS

SPECIFICATIONS

Color	Water-White
Specific Gravity at 20°/20°C.	0.74-0.76
Acid Insolubles	Not over 1.0%
Water Dilution	At least 5:1
Monobutylamine Content	At least 94%
Distillation:	
Initial Boiling Point	Not below 73.0°C.
Not less than 95%	Below 82.0°C.
Final Boiling Point	Not above 86.0°C.

OTHER PROPERTIES

Molecular Weight (Calc'd.)	73.14
Average Weight per Gallon	6.25 lbs.
Flash Point (open cup)	Less than 40°F.
*Boiling Point	77.8°C.
*Specific Gravity at 20°/4°C.	0.740
*Freezing Point	—50.5°C.
*Refractive Index at 20°F.	1.401
*Coefficient of Expansion per deg. C.	0.00134

*Literature values for pure Mono-n-butylamine

We will be glad to cooperate with those who are interested in investigating the possibilities of this amine. A sample will be sent promptly upon receipt of your request on company letterhead.

Sharples Chemicals Inc.

PHILADELPHIA · CHICAGO · NEW YORK

For Chlorination, Sulfonation, and other organic syntheses, use these Hooker Sulfur Products...

Hooker sulfur products are valuable to chemists because they are all extremely reactive and capable of being utilized in many different reactions. For example, the sulfides are extensively used in the preparation of organic sulfides, mercaptans, thioglycols and thio acids. All of the sulfur-chlorine compounds are important as chlorinating agents. Sulfuryl chloride, in addition, has great potentialities in organic synthesis for sulfonation, and as an acylating and condensing agent. The high quality of these Hooker chemicals, their freedom from impurities which might vitiate these reactions, are important reasons for choosing Hooker sulfur products.

Technical data sheets describing more fully the properties of these products are available. If you are particularly interested in the reactions of Sulfuryl Chloride or other specific chlorinating agents, you may also want copies of the following bulletins:

Bulletin No. 330—Sulfuryl Chloride in Organic Chemistry.

Bulletin No. 328A—Hooker Chlorinating Agents.

HOOKER RESEARCH *Presents*

DIMETHYL CYCLOHEXANE

$C_6H_{10}(CH_3)_2$

A new hydrogenation product of Hooker Research is offered for your consideration. An examination of its physical properties may suggest interesting applications. Dimethyl Cyclohexane is a hydrogenated xylene, but in its chemical behavior it resembles the aliphatic hydrocarbons more than the aromatic. It can be oxidized or reacted with halogens to yield products of potential value in organic synthesis.

Briefly, Dimethyl Cyclohexane is a water white liquid of mild odor. It consists of a mixture of meta-, para-, and ortho- isomers. Its freezing point is below -65°C, its boiling point is 120°C, its specific gravity at 15.5°/15.5°C is 0.776. Its water solubility is extremely low and it is completely miscible with most common solvents.

Technical Data Sheet No. 360 describing the chemical more completely, and experimental samples are available when requested on your business letterhead.

PRODUCT *Chemical Formula* *Molecular Weight*	DESCRIPTION & USES
Sodium Sulfhydrate NaSH; 56.1	A light lemon colored solid in flake form. Melting point 55°C Min. Manufacture of thiosulfate, thio urea for sulfa drugs, thiosalicylic acid, thio and dithio benzoic acids, sodium thio sulfate; preparation of dyestuffs and other organic chemicals; catalyze formation of thioamides; unhairing hides; desulfurizing viscose rayon and in ore flotation agents.
Sodium Sulfide Na_2S; 78.1	A light salmon colored solid in flake form. Melting point 100°C Min. Manufacture of dyestuffs, intermediates, organic sulfides, insecticides, paper pulp, special glass, soap and rubber; as an ingredient of dye liquor; engraving, lithography, and printing; ore flotation and refining metals, dissolving cresol from coal tar oils; unhairing hides; desulfurizing viscose rayon.
Sodium Tetrasulfide Na_2S_4; 174.23	Aqueous solution containing 40% by weight of compound. Clear, dark red liquid. Reducing organic nitro bodies; manufacture of sulfur dyes; insecticides and fungicides; ore flotation reagent; soaking hides and skins; preparation of metal sulfide finishes.
Sulfur Dichloride SCl_2; 103	Dark brown or reddish liquid. Sp. Gr. 1.638±.005. Decomposes above 40°C. 66% Min. Cl_2 content. Chlorinating agent, in manufacture of organic acid anhydrides and in organic synthesis.
Sulfur Monochloride S_2Cl_2; 135	Yellow to slightly reddish liquid. Sp. Gr. 1.690±.005. B. P. 138°C. 50% Min. Cl_2 content. Manufacture of insecticides, linseed oil substitutes, dye intermediates, pharmaceuticals, organic acid chlorides.
Thionyl Chloride Refined and Technical $SOCl_2$; 119	Colorless to yellow or pale red liquid. Sp. Gr. 1.644. B. R. Tech. 72° to 79°C. B.R. Refined 75° to 78°C. Chlorinating agent. Forms organic acid chlorides and anhydrides, alkyl chlorides from corresponding alcohols.
Sulfuryl Chloride SO_2Cl_2; 135.0	Light yellow liquid. Sp. Gr. 1.680. B. R. 2° including 69.1°C. Chlorinating agent to produce chlorphenol and other chlorination reactions in organic synthesis. Forms chlorides and anhydrides of organic acids.

HOOKER ELECTROCHEMICAL COMPANY

3 Forty-seventh Street, Niagara Falls, N. Y.

NEW YORK, N. Y. TACOMA, WASH.

WILMINGTON, CALIF.

HOOKER CHEMICALS

Caustic Soda **Muriatic Acid** **Sodium Sulfide**

Paradichlorbenzene **Chlorine** **Sodium Sulfhydrate**

8351

READY TO HELP YOU WITH YOUR PROBLEMS

DARCO

TECHNICAL SERVICE

BOOTH 46-47

EXPOSITION OF CHEMICAL INDUSTRIES

GRAND CENTRAL PALACE

FEBRUARY 25 — MARCH 2

Darco Activated Carbons

Symbolically resembling the carbon atom itself with its four valences, Darco Activated Carbons have four general fields of use, as described below.

Darco carbons also have four supremacies in their physical properties: high adsorptive capacity, maximum filterability, purity and low retention loss.

Concentration by Adsorption and Elution

Penicillin is being concentrated in large scale operation by adsorption on Darco G-60, followed by elution (desorption) with a small volume of suitable solvent.

The principle of this concentration process is being studied for the recovery of other organic products, and indicates a large new field of use for activated carbons.

Catalyst and Catalyst Carrier

The enormous surface presented by activated carbon has led to its use in many catalytic processes. Both powdered and granular grades are used in this field.

Carbon may promote reactions by concentrating the reagents at its surface, or it may be used as a base for metal and metal oxide catalysts. Platinum and palladium on Darco G-60 are successful illustrations of this use.

Purity Maintenance in Continuously Used Liquids

For many years Darco DC has been used for the removal of color, odor, and fatty acids from dry cleaning solvents, permitting their continual reuse.

Darco S-51 is used for continuous removal of impurities from electroplating solutions, thus maintaining a high purity level and permitting maximum brightness, adhesion and corrosion protection by electrodeposit.

Color, Odor and Colloid Removal

This is, of course, the best known and most widely used application for Darco. Corn, cane and beet sugars, vegetable oils and fats, industrial and fine chemicals, municipal and industrial water supplies, and a host of other things are purified with Darco.

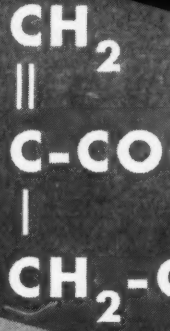
DARCO

DARCO—REG. U. S. PAT. OFF.

DARCO CORPORATION

60 East 42nd Street, New York 17, N. Y.

ITACONIC ACID



Molecular Weight . . .	**130.10**
Appearance	**White, crystalline, solid**
Melting Point	**167-168°C.**
Solubility in Water . . .	**At 20°C. a saturated solution contains 7.6 grams of Itaconic Acid per 100 grams of solution.**

This unsaturated dibasic acid, now available in research quantities, offers many possibilities as a raw material in the field of chemical industry.

It can be used as a raw material in the preparation of resins of various types.

Its esters can be polymerized to yield colorless, transparent plastics of varying characteristics, depending on the alcohol with which the acid is combined. They can also be co-polymerized with other monomers, opening a wide range of possibilities.

Its structure indicates that it might prove a useful raw material for the preparation of wetting agents.

It can be converted to citraconic or mesaconic acid and forms an anhydride.

Reduction yields methyl succinic acid which, in turn offers other possibilities as a raw material.

Itaconic Acid is not yet being prepared in commercial quantities, but limited amounts are available for laboratory research.

For samples and further information, please inquire of Chas. Pfizer & Co., Inc., 81 Maiden Lane, New York 7, N. Y.; 444 West Grand Ave., Chicago 10, Ill.

PFIZER *Manufacturing Chemists Since 1849*

LIFE...ON THE

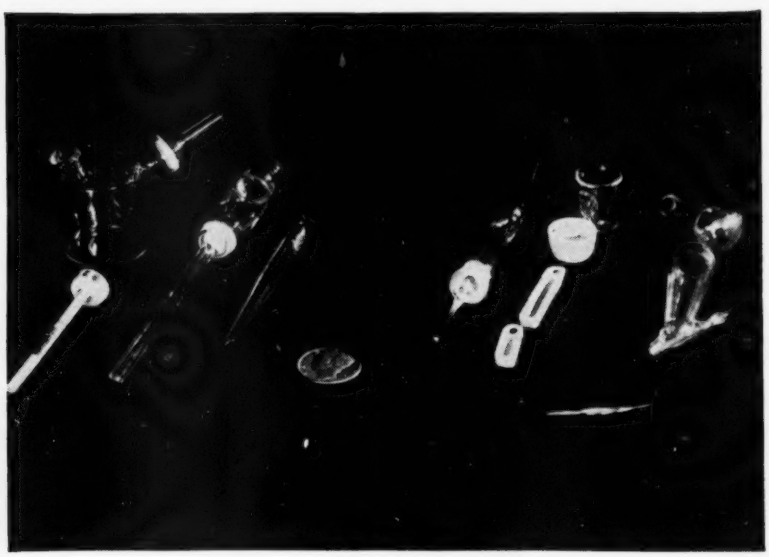
The analytical chemist's conventional platinum crucible with the microanalyst's platinum filter crucible beside it.

A sample of penicillin contained in a platinum microcombustion boat being placed in a glass-stoppered "piggie" preparatory to weighing.

The microanalyst's porcelain microcombustion boat containing a sample for testing.

IT'S A SMALL WORLD FOR THE "GULLIVERS" OF MICROCHEMISTRY

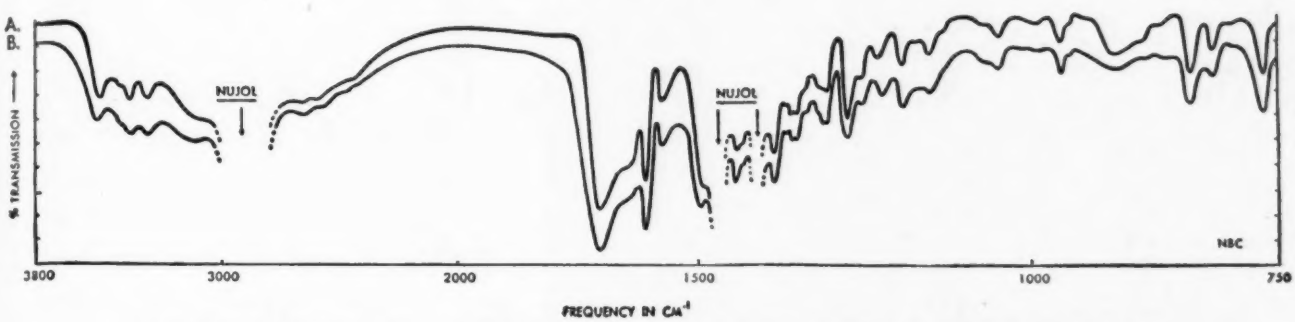
The microchemist performs a vital function—analysis of materials developed by organic research. He must work with extremely small and often precious quantities of materials, and with apparatus of a proportionately minuscule scale. For example, test tubes are no larger than pencil erasers and beakers, flasks and crucibles as tiny as a child's thimble. Often the quantity of a new material available amounts to but a few grains or a fraction of a drop weighing little more than a milligram, which may have taken months of painstaking effort to produce. This he must analyze or react with other components to gain priceless information regarding its constituents, atomic structure, or usefulness. Thus, out of this "small world" of research have come the keys to large-scale production of many important products, among which are the sulfa drugs, penicillin, melamine, and a long list of other progress-creating industrial chemicals. Cyanamid maintains microanalytical departments in its research laboratories. Here new materials are analyzed, samples checked and tested for purity, and the structure of hundreds of chemical individuals determined by "micro" methods. It's a small world but very important in the scheme of large-scale and long-range research through which Cyanamid is promoting progress in a score of industries that supply the things we use in every-day living.



Shown in size relationship to a ten-cent piece are, from left to right . . . porcelain filter stock, sintered glass filter tube, microcentrifuge tube, micro weighing "piggie," microcombustion boat (small and medium sizes), 1 ml. porcelain crucible, 1 ml. glass beaker, snipe feather, boat-shaped microtitration cell, spherical microtitration cell, 5 ml. pear-shaped flask.

CHEMICAL NEWSFRONT

INFRARED ABSORPTION SPECTRA



Two Infrared Autographs. *A.* Folic acid derived from liver. *B.* Folic acid made synthetically. The obvious similarity demonstrated that the synthetic was chemically identical with the natural product.

THE SCIENCE OF INFRARED AUTOGRAPHS—The infrared region of light lies, as its name indicates, next beyond the outside red band at one side of that split-up of visible light which we know as the rainbow. It is, in terms of the wave length range of its electromagnetic vibrations, many times as wide as the band of visible light. The infrared invisible light is emitted by any hot object and can be utilized in many ways.

If infrared rays are allowed to fall on a pure substance, and their frequency is gradually altered, the frequencies will successively reach the same frequency as that of one of the several molecular vibrations of the substance and the infrared rays will be absorbed instead of passing through undisturbed. Location of all the absorption bands of the substance on the scale of frequencies provides valuable evidence for identification. The record of the examination of a substance can be made by a simple mechanical pen device over a calibrated scale of frequencies in a wavy irregular line which relates the degree of absorption of the infrared rays to the various frequencies at which such absorption occurs. Thereby a pure substance literally writes its own unique autograph in a few moments.

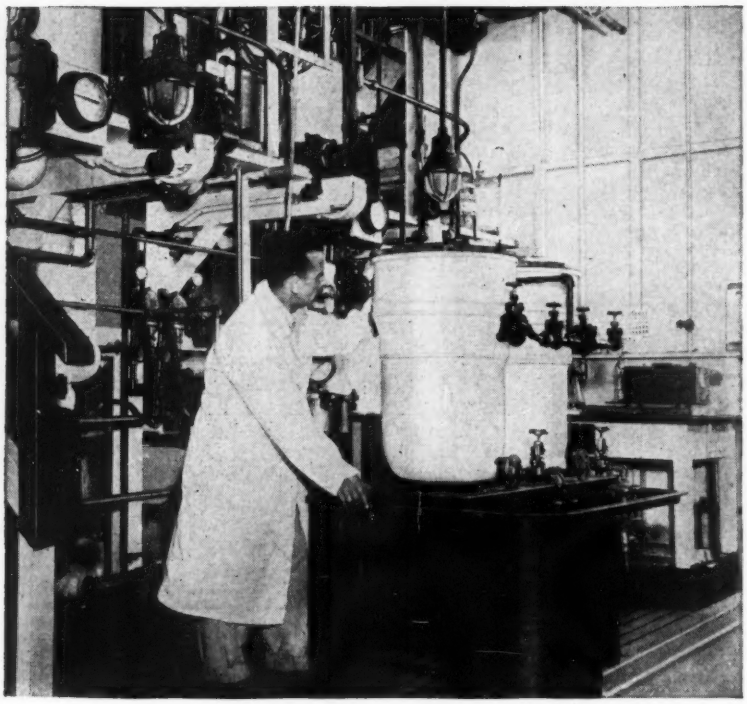
When infrared spectroscopy is to be used for limited routine analyses as on some single product in manufacture, the spectroscope can be simplified so that anybody can use it for the specific purpose. A small and inexpensive instrument is now being made as a standard stock item by several optical instrument makers.

A NEW LEAF IN TOBACCO HISTORY—A remarkable chemical is helping tobacco growers everywhere raise hardier, healthier plants of all types...and at the same time save many days of back-breaking labor every year!

This chemical is "AERO"* Cyanamid, a combination weed killer and fertilizer. Applied to tobacco plant beds from sixty to ninety days before the tobacco seeds are planted, "AERO" Cyanamid destroys the weed seeds before they have a chance to germinate. Later, it undergoes a chemical change and loses this killing power, becoming a fertilizer and enriching the soil to produce sturdy, more disease-resistant transplants which in turn yield a better, earlier crop of finer tobacco leaves.

Here is a double benefit of tremendous importance. But "AERO" Cyanamid offers another advantage of equal if not greater value to the farmer. It eliminates the costly and time-consuming job of hand weeding, which in most cases is a matter of great expense. "AERO" Cyanamid is also being used with similar success by other farmers for controlling weeds in tomato, pepper, celery and various other transplant beds. A common estimate among farmers is that "a dollar spent for 'AERO' Cyanamid saves ten dollars in labor."

*Trade-Mark Reg. U. S. Pat. Off.



Final stage in the purification of penicillin—the removal of pyrogens by filtration of the penicillin concentrate.

Penicillin Merck meets the recognized high standard of quality established for all Merck products. It is subjected to repeated tests and control procedures throughout every step of the production process, and the finished product is assayed, tested, and approved under rigid standards established by the Food and Drug Administration and by the Merck Analytical Laboratories.

★ ★ ★

A GLIMPSE AT THE RECORD

IN 1940 Merck research on antibiotics concentrated on Penicillin.

IN 1941 Merck brought about a reciprocal arrangement between British and American investigators to spur the production of Penicillin in co-operation with the United States and British governments.

IN 1942 Merck supplied Penicillin for the first case of bacteriemia successfully treated with this drug in the United States.

IN 1943 Merck sent shipments of Penicillin to England by air transport for urgent therapeutic use by the United States Army Medical Corps.

IN 1944 AND 1945 Merck produced ever-increasing supplies of Penicillin for our Armed Forces.

AND NOW, Merck production of Penicillin has reached a point where, in addition to meeting continuing military requirements, large quantities are being produced for civilian medical needs.

PENICILLIN
MERCK
ACCEPTED AMERICAN MEDICAL ASSN. Council on Pharmacy and Chemistry
Council Accepted

Literature on request

MERCK & CO., Inc. *Manufacturing Chemists* **RAHWAY, N. J.**

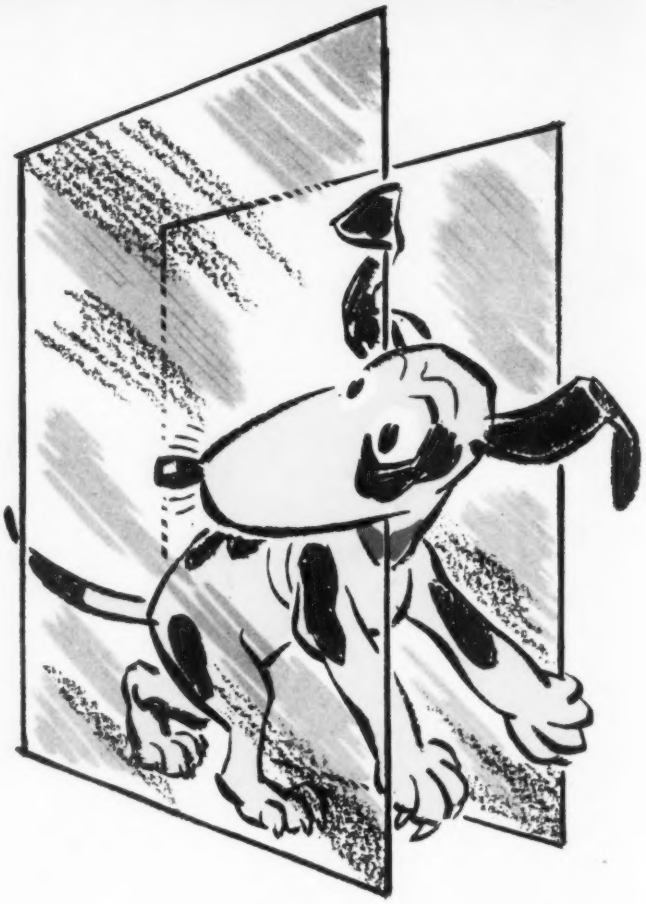
In Canada: MERCK & CO., Ltd., Montreal · Toronto · Valleyfield

CUES AND CLUES

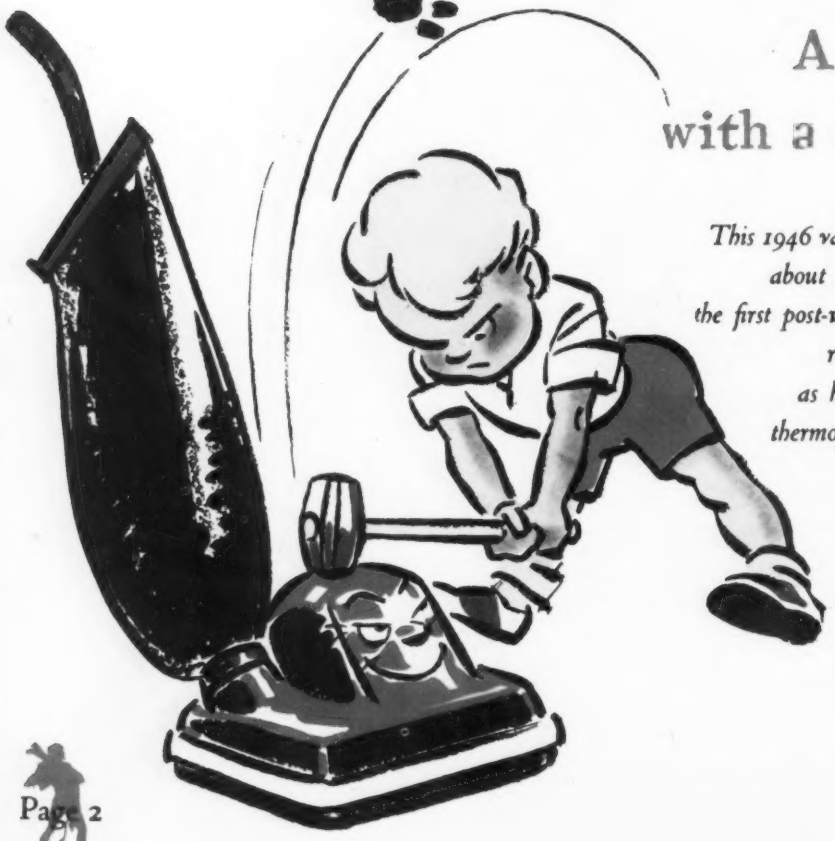
for improved products and processes

Looking for a cue to a new or better product? A clue that may mean a short-cut in your processing? Then trace these tracks through the following three pages. Shown here are just a few of the many ways Hercules chemical materials have helped others in their search. If these examples suggest a solution to your problem, please tell us about it. The coupon on Page 4 brings helpful literature by return mail.

Here's clear-cut counsel from Hollywood



In modern cartoon animation it's what the movie-goer doesn't see that counts. For example, the transparent cellulose acetate sheeting on which figures and scenes are drawn and photographed. Invisible to the camera except where painted, this crystal-clear material enables a single "shot" to be made up of many sheets, arranged at different camera levels—thus the remarkable three-dimensional effects achieved. Why not put the transparency, toughness, flexibility, and chemical resistance of acetate sheets to work for you? Hercules' 36-page booklet, "Cellulose Acetate," gives details. For your copy, return coupon on Page 4.

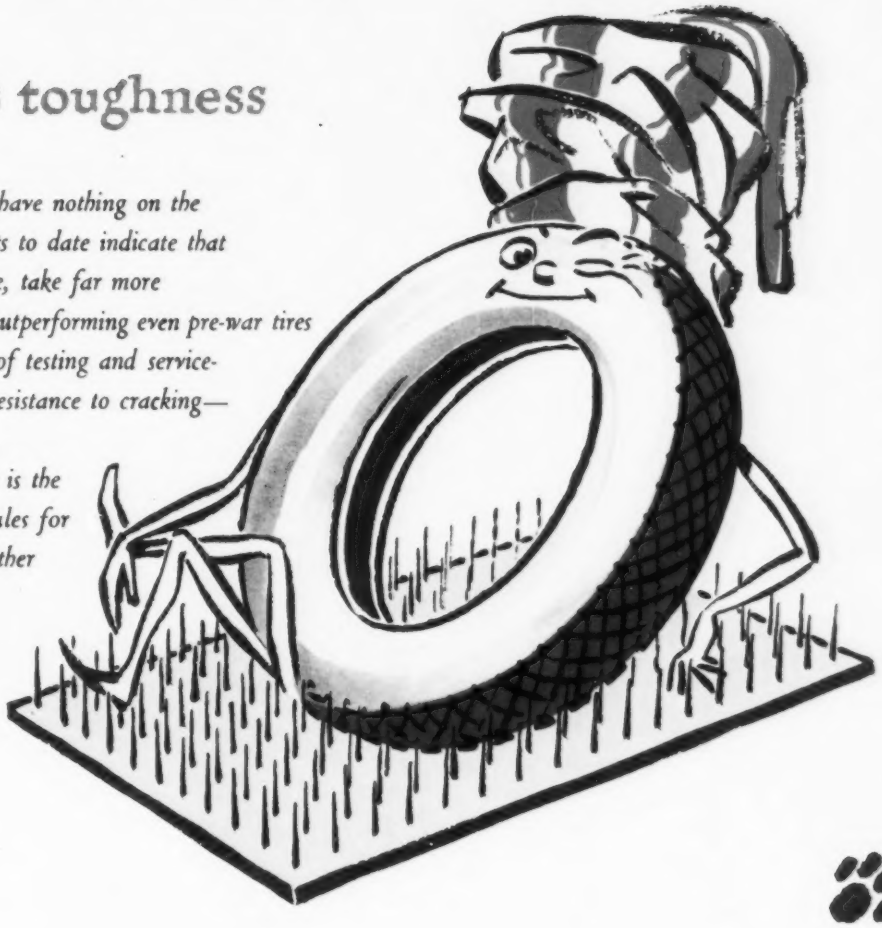


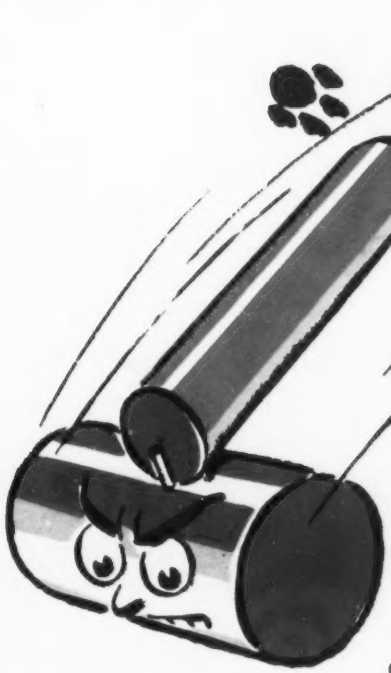
A vacuum cleaner with a solid suggestion

This 1946 vacuum cleaner can afford to be complacent about hard knocks. Its plastic parts are among the first post-war uses of Hercules ethyl cellulose. Once restricted to army and navy products, such as housings for flashlights and VT-fuzes, this thermoplastic offers remarkable impact resistance plus color range and light weight for a thousand peacetime products. It is outstanding among thermoplastics for dimensional stability when exposed to extreme temperatures and humidities. Complete technical details obtainable by returning coupon on Page 4. Ask for 36-page booklet, "Ethyl Cellulose."

This tire teaches toughness

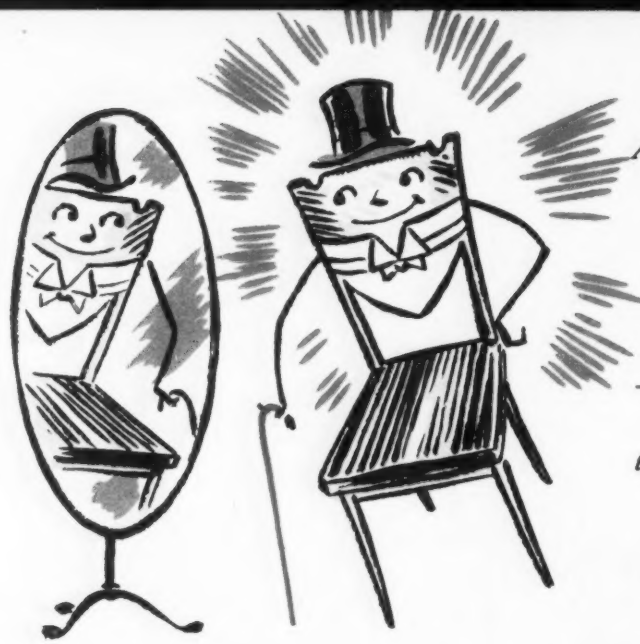
The Hindu fakir's feats of fortitude have nothing on the newest synthetic rubbers. Developments to date indicate that tires made from GR-S-10, for instance, take far more punishment than earlier synthetics—outperforming even pre-war tires of natural rubber. Millions of miles of testing and service-use have demonstrated their greater resistance to cracking—they run cooler, retain their strength, at higher speeds. Contributing largely is the unique emulsifier developed by Hercules for GR-S-10 . . . Dresinate 731. For further information on this emulsifier, return coupon on next page.*





Pointers from a pest pilot

Many civil authorities responsible for insect control could take a tip from the flying exterminators of Suffolk County, N. Y. For a number of years the Suffolk County Mosquito Extermination Commission has waged a successful war on disease from the air! Today, insecticides made from Hercules modern toxicants, sprayed from planes at tree-top level, keep mosquitoes, ticks, and similar germ-carrying pests under control—without endangering valuable animal life. For information on Thanite, DDT, and other Hercules toxicants for sprays, dips, or powders, return coupon on next page. Ask for 32-page booklet, "The Thanite Family."*



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The illustration shows Mr. Otto Mueller, packaging foreman, inspecting one of his Ampro Sound-On-Film Projectors sealed tightly within a representative moisture vapor-proof barrier, ready to be placed in a shipping carton. Packed within the barrier, with the Projector, are three small bags of Jay Cee Silica Gel . . . which adsorb "in-the-package" moisture and prevent damage from rust or corrosion.

(Cellophane packaging was used in this illustration as a substitute for the actual wrapping).

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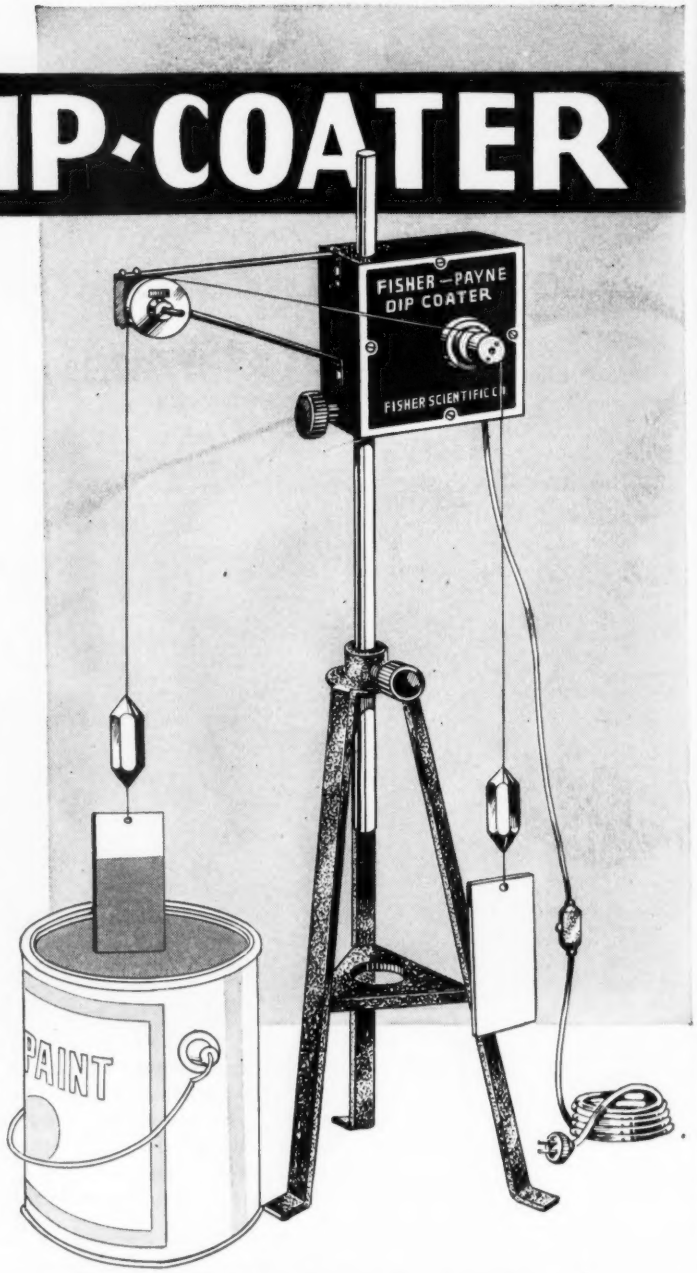

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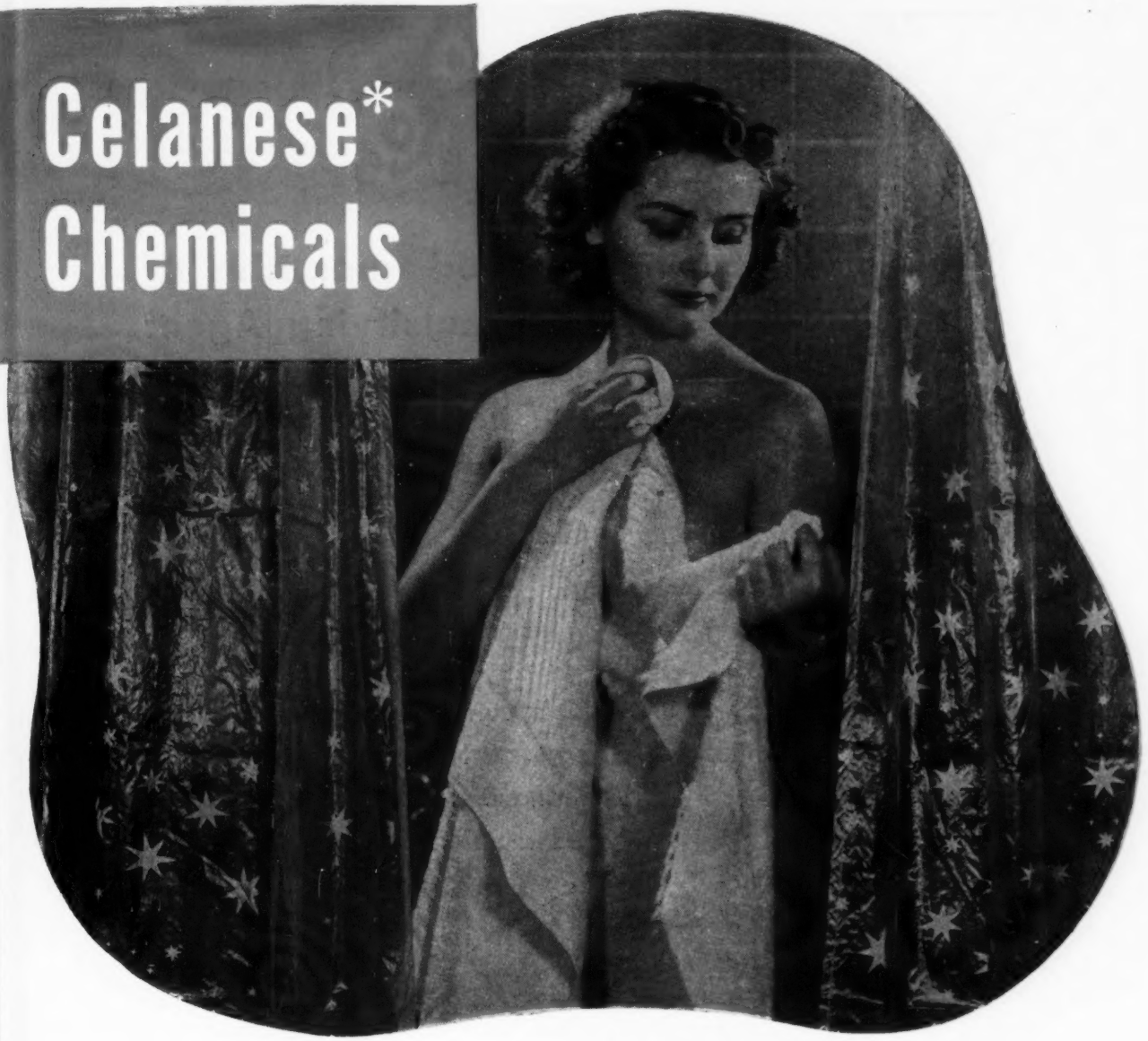
Celanese* Chemicals



The Celanese organic phosphates—Lindol and Celluflex—are used extensively as plasticizers in waterproof coatings for vinyl films and other materials.

LINDOL* · LINDOL E. P. · CELLUFLEX*179A · 179B · 142 · CELLULUBE*142

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—Glycerine!

GLYCERINE, known for generations to chemists, is still something new, something exciting in its possibilities, both for products for human consumption and for use in industry.

Glycerine is chemically stable under ordinary conditions, and by proper choice of conditions many other useful chemicals can be made from it.

For instance, glycerine is an important component of alkyd resins, used in making protective coatings and in processing textiles. It is used in making ester gum, an important constituent of varnishes.

It is one of the basic materials used in making monoglycerides, employed in shortening and margarines. And it is used in making polyglycerols, which are higher-boiling, more viscous glycerine-like substances useful in the manufacture of some of the resins.

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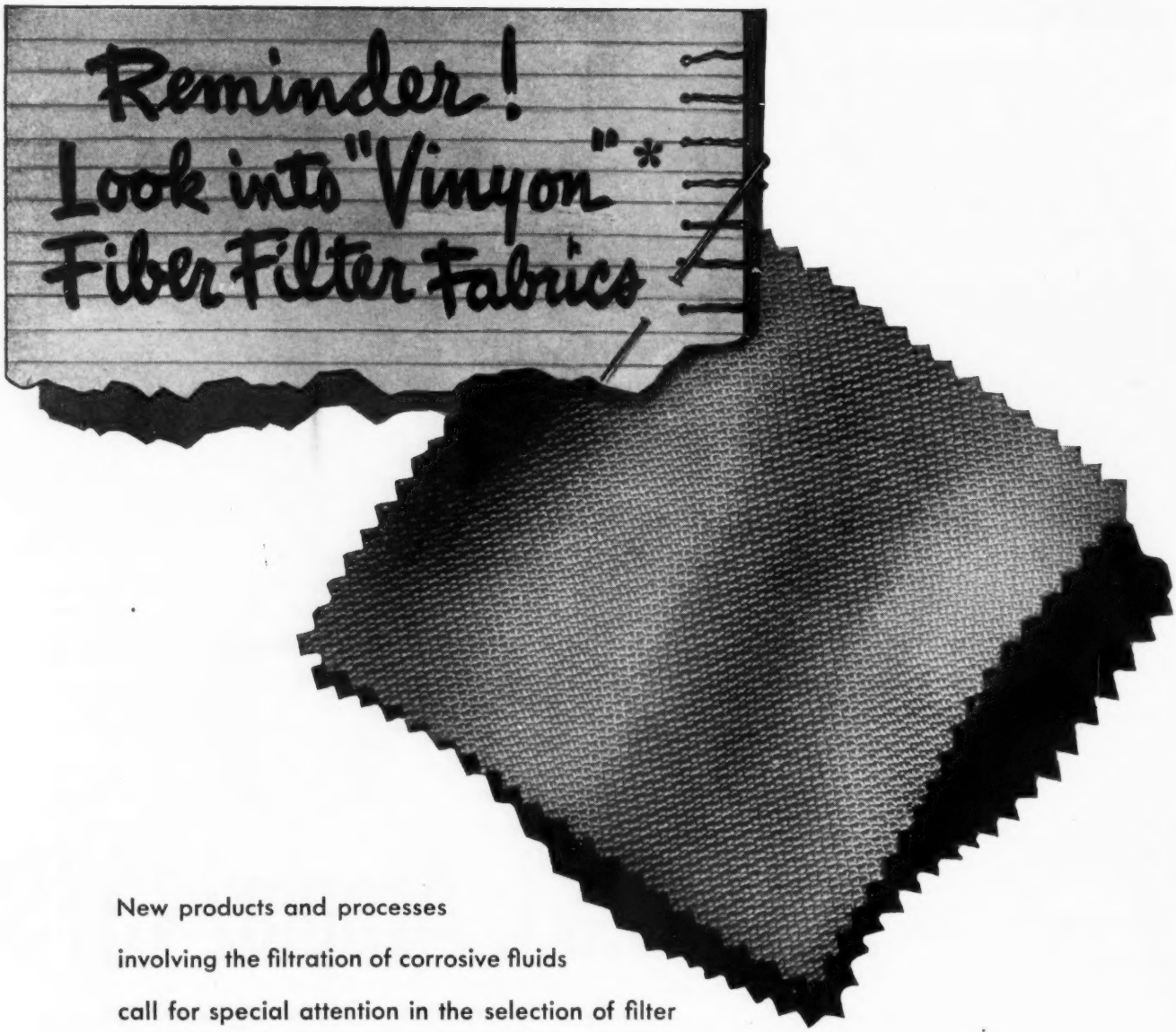
U.S.I. AROPLAZ 1379, a new modified alkyd resin of medium-to-short oil length, is U.S.I.'s answer to your current need for a high-quality, low-cost, non-quota resin. It contains no reportable oil or rosin. Its high phthalic content assures top performance in a wide variety of air-drying and low-temperature baking finishes for such items as metal cabinets, toys, hardware, implements, etc. It also works well in metal primers, low-cost finish coats, and as a general utility vehicle. Aroplaz 1379 is immediately available and is priced at a very attractive level. Your request for samples will receive prompt attention. Phone or write today.

Specifications

Solution:	49-51% solids in mineral spirits
Viscosity (G.H.): . . .	X-Z
Color (G.H. 1933): . . .	10-12
Acid value (solvent free basis) . .	10-16
Wt/gallon @250C.: . .	7.7-7.8 lbs.
Oil Content (solvent free basis) . .	No reportable oil
Phthalic Anhydride (solvent free basis) . .	33%

U.S.I INDUSTRIAL CHEMICALS, INC.
60 East 42nd Street, New York 17, N. Y.



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Baker's Chemicals

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Process Equipment

An UNUSUAL KETTLE WAS NEEDED *..here it is!*

A prominent processing company asked our engineers to design a blending kettle which had to meet special structural and operating requirements.

Here is the kettle and here are a few of its special features:

1. heat transfer requirements called for unusually high steam pressure; to withstand the pressure, jackets would have to be so thick that the weight would be undesirable; so

2. coils involving much less metal were designed to handle the pressures to be used, thereby reducing total weight from 18,500 pounds to 6,500 pounds; and

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thrusting south along the main railway line.

Wheeled Units Get to Danger Spots in a Hurry

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All Kidde Wheeled Units are supplied with two large wheels that make for ease of pushing and speedy movement, and with additional small wheels that simplify maneuvering.

No pump or other equipment is needed for operation. The carbon dioxide is discharged under high pressure by its own stored energy through the shielded Kidde nozzle.

ment troops ... within 90 miles of Mukden, vital rail center in the battle for Manchuria.

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library, ... auditorium, music room, gymnasium, ... door swimming pool. One complete wing will be devoted to hospital facilities.

... previously acknowledged that the separatists were operating in Khamseh, armed with weapons which were distributed by unknown people.

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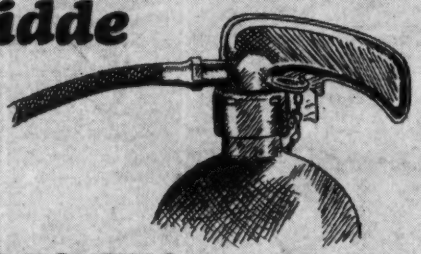

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15 pounds of flame-killing carbon dioxide . . . controlled by a single finger. A novice can operate — just aim at fire, pull trigger.

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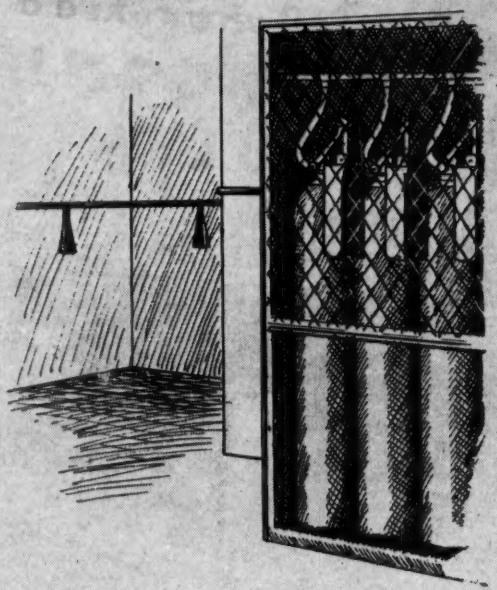

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Citizens Union

General output at factories and mines decreased 4 per cent in October, while in the first half of Novem... asic in-dleum

'Officer' Scans

stationed in a little town in France for several months, wooed a French girl by telling her abou...

Check these 5 new outstanding characteristics of ACRAWAX C

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3. speeds up production by eliminating "stick" on the mill or calender
4. mold and die lubricant
5. moisture and solvent resistance

Small percentages of high melting point (280°F.) ACRAWAX C incorporated into plastics and elastomers are producing excellent results.

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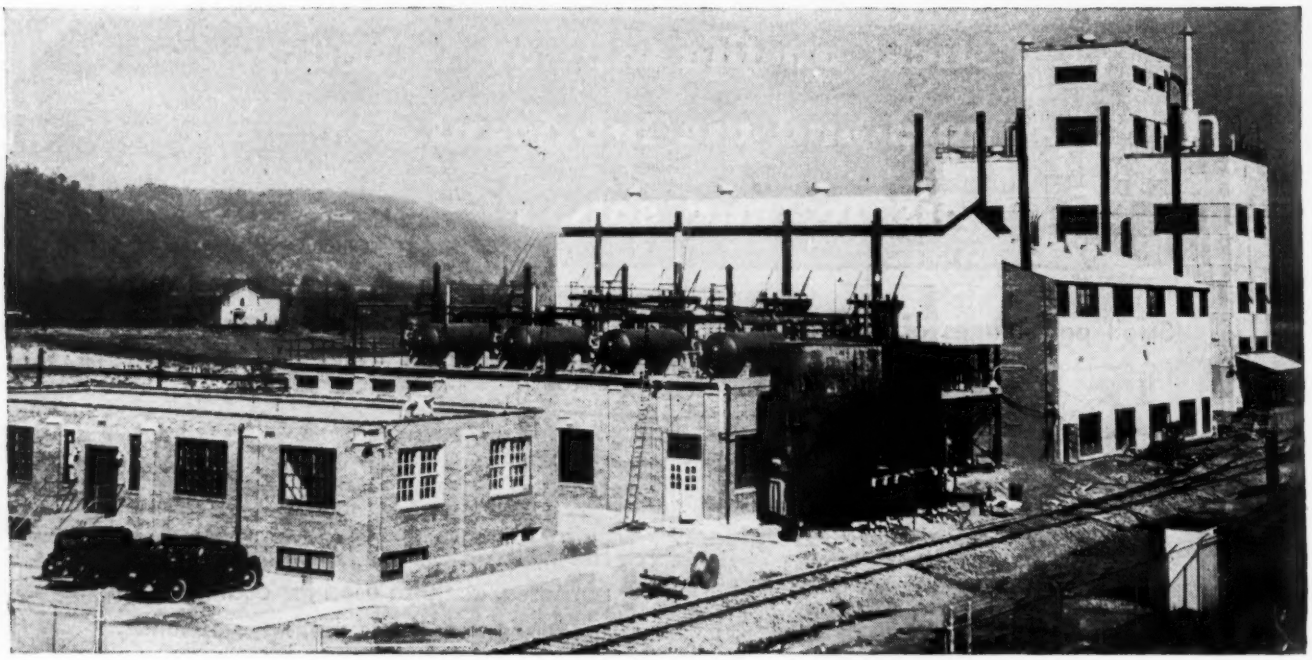
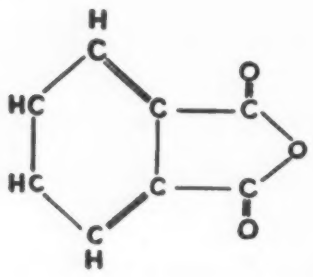
NEW *Phthalic Anhydride* PLANT





This modern chemical plant is ready to ship phthalic anhydride in barrels and multi-wall paper bags from Kobuta, Beaver County, Pa.

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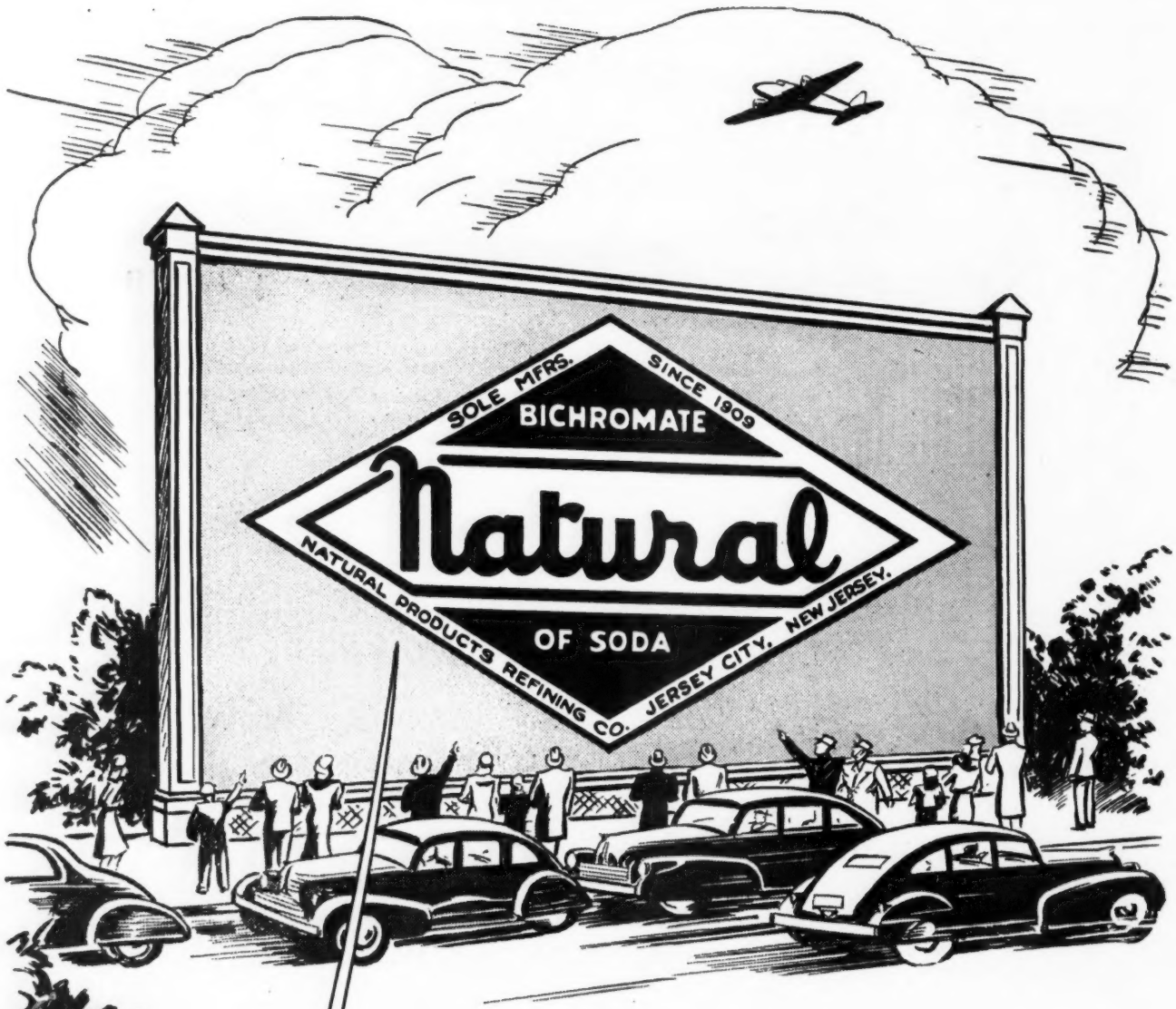

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The Will To Win

by ROBERT L. TAYLOR, editor

A RATHER SERIOUS FUNDAMENTAL CRITICISM of present day engineers—and inferentially the system that produced them—was made recently by a high official of the Manhattan Engineer District, the organization responsible for the production of the atomic bomb. Whether the criticism is justified or not, its nature and the responsible source from which it came recommend it for more than passing notice.

The official who made the statement requested that he not be identified by name, but it can be said that he is a high army man and an engineer himself and that a large part of the responsibility for the production of the bomb rested on his shoulders. He was in constant first-hand contact with many of the engineers and technical men on the project, so it can be assumed that his observations are based on fact.

"I want to make it clear," he said in prefacing his remarks, "that every group connected with the atomic bomb deserves the greatest praise and recognition. The whole undertaking was one in which the chances were many to one against success in the time we had available. Perhaps the fact that we did win under such circumstances should make unfounded what I am about to say, but I think not. In any event, I offer it as a personal opinion only, but one to which I have given a great deal of thought. It is simply this:

"You have been speaking of postwar needs in engineering education. If I were asked to name the greatest deficiency of the engineers on the Manhattan project, my answer would not be along lines of technical knowledge, or ability to use that knowledge. The greatest deficiency was lack of the will to win. A winning frame of mind is an asset on any job, but for what we on the atom project were called upon to do, it was fundamental. Combined with it had to be a high degree of physical and moral stamina. We were in a life and death race, but one of my biggest jobs was to make some of the boys realize it."

This is a harsh indictment. It would not be so hard to take were it not for the fact that American industry —its technical men included—had always prided itself in its determination and energy in overcoming obstacles and pushing forward the frontiers of achievement. The will to win has always played a major role in the development of our country and our standard of living. It was more than materials and brains that went into the achievements of the Henry Fords, the Alexander Bells, the Cyrus Fields and other industrial greats in American history. Ever since the earliest settlers, the will to win has been strong in our people.

Irrespective of the merits or justification of the opinion of the Manhattan project engineers, perhaps this would be as good a time as any for those of us engaged in chemical industry and education to do some thinking about the character training as well as the technical training of the younger men who will soon again be feeding into the ranks from our colleges and universities. Can it be that the modern emphasis on teamwork and group achievement has been at the expense of the development of the individual, the develment of those personal qualities that were outstanding in so many of our earlier scientists, engineers and industrialists? Has reliance on prior art and the opinions of experts and specialists dulled individual thinking and ingenuity, and along with them individual responsibility and initiative?

These are questions which we may well ponder today when the tendency in all branches of society, private as well as public, is to organize and regiment. Organization in some form doubtless becomes more necessary as living and working become more complex. But colleges must take pains to see that students do not become merely raw material for the educational mill, to be run through with a single setting of the controls. Industry must be careful to see that the young engineers, chemists, and physicists that come to it are offered something more than the dubious distinction of becoming cogs in the world's greatest production machine. Suitable determinants and incentives for individual accomplishment must be scrupulously maintained if we are to continue to reap the benefits of group endeavor without impairing those individual qualities that have preserved us and made us great in the past. If we overlook these things we must not be too surprised if there are more occasions when the will to win appears lacking.

Scientific Russian

WARS USUALLY BRING WITH THEM many corollary effects. One of these resulting from World War II and of particular interest to chemical people is the emergence of Russian as the principal foreign scientific language of the future. There seems little doubt that it will be many years, if ever, before Germany regains her prewar place in the scientific world. While there will continue to be contributions in German to the scientific literature, they will be on a much reduced scale. French, likewise, shows little promise at the moment of increasing its stature as a scientific language.

In fact it seems likely over the next few years that chemical students expecting to go into research laboratories will find it necessary to learn two foreign languages: German for the past, and Russian for the future.

The Inflation Battlefront

WITH INFLATION AT OUR GATES it is as important today to produce and distribute civilian goods promptly and equitably, and in great volume, as it was when the enemy consisted of hostile armies and navies. All indications are that the inflation danger has increased markedly in the past few months, and it will continue to increase as long as production is held up by strikes, too-low price ceilings, or any other deterrent.

The public has become so accustomed to advancing prices that it hears talk of further increases with great complacency and, like labor, hopes to get more pay without taking into account that this hastens the process of pushing up the spiral.

Any individual or company that can increase its productive output today is helping itself and making a contribution to the national welfare at the same time. The same is true of those who speed up distribution and take seriously their job of voluntary rationing. Industry should be greatly concerned with checking the decline in the purchasing power of the dollar. As the dollar goes down, the backlog of buying power grows smaller. It is of prime importance to manufacturers that the money in the hands of customers does not shrink in value.

A Time for Real Leadership

THERE SEEMS TO BE A GROWING RECOGNITION among both the public and government that labor organizations have incompetent leadership. At the same time there is also some feeling that some business and industry leaders are not all that they might be.

While chemical companies, as indicated by their record of growth, have probably been as free of deadwood in high positions as any industry group, the reconversion period nevertheless offers a fit opportunity for any weeding out or realigning of duties that ought to be done.

When George C. Marshall was made Chief of Staff of the U. S. Army he was jumped over twenty-nine officers who were his senior. Most companies have leadership timber in the ranks. The problem, where streamlining is needed, is to throw off the dead hand of seniority, of hereditary succession and of those who come into power through political maneuvering. It must be done, if individual companies are to be prepared for the competitive conditions ahead, and if private industry is to meet the challenge of providing jobs for all who are willing and able to work.

Chemistry in Warfare

THE EXTENT TO WHICH WARFARE has become a chemical operation was emphasized in a recent statement by Major General Alden H. Waitt, new Chief of the Chemical Warfare Service.

"The outstanding results achieved with chemical agents in fire and smoke weapons, plus the potential menace of surprise gas attacks, has given the American chemical industry a new importance in preserving the peace," declared General Waitt.

"The Army recognizes that contributions by the chemical industry spurred the offensive and hastened the victory. Without the ingenuity of chemical research and development, our incendiary bombs, flamethrowers, chemical shell and smoke-generating appliances would not have been so decisively effective, nor would our high degree of preparedness for gas have dissuaded the enemy from introducing that weapon. I can't pay too high a tribute to the many firms, institutions, groups and individuals responsible for the unprecedented success of chemical weapons and munitions, both active and passive."

General Waitt did not mention the atomic bomb, which was as much a product of chemistry as of physics. Weapons do not make wars, but weapons win wars, and until all of the nations of the world agree to lay down their arms, an alert and progressive chemical industry will be essential to the future security of our country.

Public Speaking for Scientists

EXECUTIVE TRAINING COURSES which have long been used in a number of larger companies have usually included some form of practice in public speaking. The ability to talk has always been considered a desirable attribute for an executive (if you can't convince 'em, out-talk 'em). But it is news when a large company in the chemical process field requires that all of its research people take the Dale Carnegie course in effective public speaking and personality development. Look to your language, chemists! The time may soon come when you will have to tote a soapbox to the pre-employment interview.

Inflation Editorial

ONE CHEMICAL COMPANY reports that the reserve it had set aside for postwar expansion will now pay for a unit only half as large as that originally planned. Result: Increase in contemplated price of the product. Decrease in number of new jobs.

What PROTECTIVE COATING Makers Would Like from the Chemical Industry

by ROBERT F. RUTHRUFF, Director of Research
The Sherwin-Williams Co. Chicago, Ill.

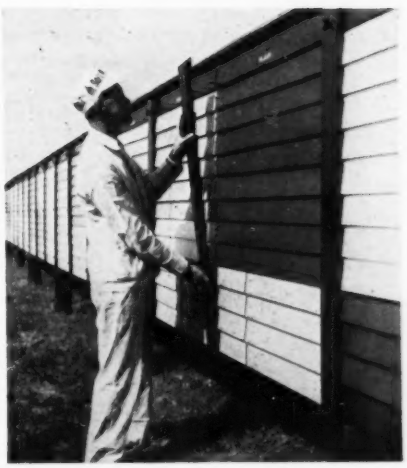
THE PERFECT PAINT may never be made, but protective coating manufacturers have some definite ideas as to what such a paint would do and what it would contain. New chamicals would play a definite part in it. Here are some thoughts of one prominent maker on how chemical industry might contribute to coating progress, not to mention broaden its stake in a growing market.

AT THE moment, those engaged in the protective coating industry would consider their chemical needs well satisfied were they able to get really adequate supplies of good old fashioned linseed oil and rosin. For the future, however, the industry is continuing to look for better materials that will enable it to put out improved, easier handling products at lower cost. Most of these better materials must come from the chemical industry, and it is thus the thought here to outline what seem to be some of the coating makers' more outstanding chemical needs which at the same time do not appear to be entirely outside of the realm of possible attainment.

Before proceeding, however, let us make sure that the terms which will be used in this discussion are clearly understood. A protective coating composition must contain, at the very minimum, a film forming substance, or binder. Binders are materials, almost invariably organic, that are capable either of directly forming a more or less adherent and impervious coating on surfaces (non-convertible type) or of forming such a coating after undergoing certain chemical reactions (convertible type). Since non-convertible binders undergo no material change in chemical or physical properties immediately after application, it is obvious that they cannot be applied alone unless they are applied in the actual physical form of the final desired film—a possibility that should not be overlooked. More usually, however, the non-convertible binder is dissolved in an organic solvent. On applying the resulting solution to a surface the solvent evaporates, leaving behind the desired film of the non-convertible binder. Actually, for many years past, non-convertible binders have almost invariably been employed in conjunction with convertible binders, but the non-convertible binder may be considered as constituting the backbone of the final film formed by surface coating materials generally known as lacquers.

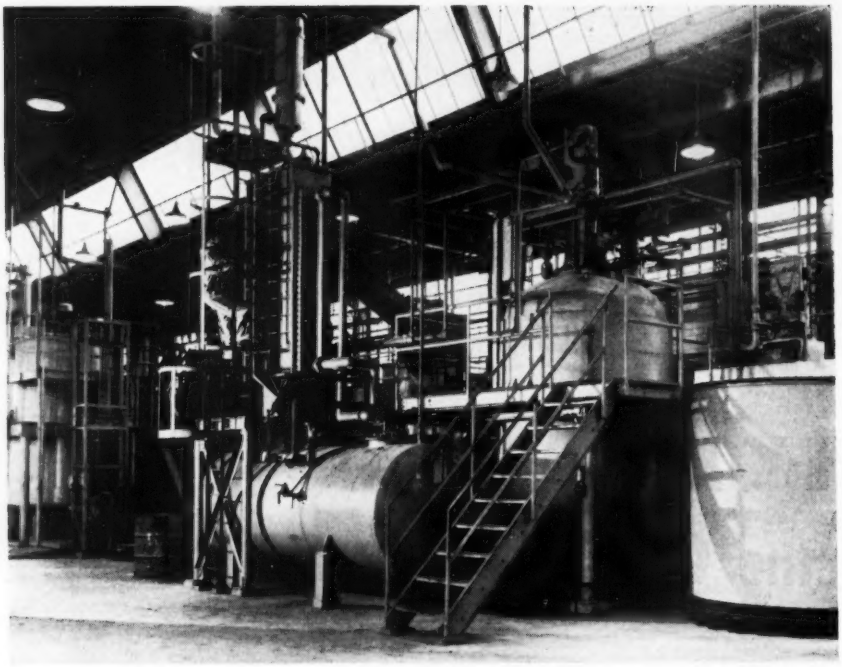
The convertible binders form films only after undergoing some chemical reaction such as oxidation, polymerization, condensation, or the like. Theoretically and actually, then, it is possible to form a coating by simply applying a film of a liquid convertible binder to a given surface and then allowing chemical reaction to proceed. Almost invariably, however, other materials are used in conjunction with the convertible binder, for example, a thinner, which is nothing more than a solvent or miscible diluent that brings the convertible binder to physical conditions more suitable for application.

Very frequently protective coating compositions contain solids, broadly termed pigments. Usually pigments are employed for the purpose of hiding the surface to be coated (opaque pigments). White opaque pigments, which constitute a substantial portion of this group, are often used in admixture with colored tinting pigments to enhance the decorative value of the finished film. Some pigments, here called extenders, have little or no hiding power and usually no color. These are employed principally to adjust volume relations to give the finished film more durability than it would otherwise have, to control consistency, regulate flow, gloss, etc. Extenders may be used in the absence of any other pigment, in which case a substantially clear but full film results. More usually, however, extenders are employed in conjunction with opaque pigments and tinting pigments. Specialized pigments may be used to inhibit subsequent corrosion of the coated surface, to improve adhesion of the film to the surface, and for many other miscellaneous purposes.



A good red pigment with the color retention of the phthalocyanines is desired.

Based on a paper entitled "Future Chemical Needs of the Protective Coating Industry," presented by the author before the Chemical Market Research Association at Cleveland, Dec. 14, 1945.



The Sherwin-Williams Company's chemical plant helps supply some of the materials used in the company's coating formulations. An extensive research laboratory is also maintained.

In the following paragraphs an attempt will be made to consider briefly a few of the possible future needs of the protective coating industry with respect to the major components already mentioned. Consideration will be given, in order, to thinners (including solvents), pigments (opaque pigments, tinting pigments and extenders) and binders (non-convertible and convertible). Unfortunately, space limitations preclude any consideration of many minor but highly important—and frequently essential—components of surface coating materials such as driers, plasticizers, and the like.

THINNERS

Convertible binders are usually soluble in or miscible with liquid aliphatic hydrocarbons. Accordingly, in most cases, ordinary petroleum naphthas are suitable for use as thinners, a high solvent power being, in general, unnecessary. The principal function of these thinners is to reduce the system to a workable viscosity.

In the drying of a film containing a convertible binder, a succession of odors, invariably unpleasant, may frequently be detected. First, there is the odor due to the thinner as it evaporates from the freshly applied and still wet film. This is usually followed by the well known "painty" odor generally ascribed to volatile byproducts produced during the chemical conversion of the binder. However, the surface coatings industry is approaching the virtual elimination of the "painty" odor during the drying of interior finishes. This done, the more transitory but equally unpleasant odor of the thinner remains. There is great need in the industry for a really odorless thinner or at least a thinner with an odor generally recognized as pleasant.

It is to be emphasized that an odorless thinner means more than merely a doctor sweet naphtha. Only the petroleum chemist is pleased with the odor of a sweet naphtha—to all others the odor is obnoxious. What is desired is a truly odorless thinner or, failing in this, a thinner with a pleasant odor similar, for example, to the fruity odor of straight-chain paraffins.

Obviously, the non-convertible binders have, prior to application, already been converted to their ultimate extent and accordingly are of rather high molecular weight. For this reason they are frequently not appreciably soluble in petroleum naphthas but instead require solvents of great power. Practically without exception such highly efficient solvents have two disadvantages. In the first place they are relatively expensive organic chemicals such as alcohols, ketones, esters, and the like. Secondly, they possess an overpowering and, to most individuals, very unpleasant odor. The lacquer industry would get a very valuable boon were a relatively inexpensive, odorless yet powerful solvent developed for the non-convertible binders employed.

PIGMENTS

The hiding power of an opaque pigment depends fundamentally upon the refractive index of the chemical comprising the pigment. Since refractive index is a definite physical constant of a chemical compound or element, it cannot be altered, and accordingly increasing opacity by increasing refractive index can only be achieved by passing from one pigment of low refractive index to another of higher refractive index. To a lesser extent the hiding power of a pigment depends upon the size and shape of the pigment particle and the relationship of these factors to the wave length of the light concerned in the reflections and refractions. Accordingly, changes (frequently very material ones) may be achieved in the hiding power of a single pigment species by the proper conditioning of the pigment particle with respect to size and shape.

At present, titanium dioxide is the outstanding white opaque pigment. Being of high refractive index and of fairly high density, it affords the best available means of introducing the required opacity with minimum volume of pigment. This combination gives great latitude to the formulator for, as the required amount of hiding power is achieved with a small volume of this opaque pigment, the amount of additional solids necessary to give the proper pigment volume concentration is large, and accordingly other solids may be chosen and used in amounts adequate to insure other desirable properties in the final film. With a low hiding power pigment it frequently happens that the predetermined pigment volume concentration is nearly or actually reached at the time adequate hiding power has been achieved, so that there is little or no leeway for further improving the final film properties by the use of other solids.

While titanium dioxide is at present the outstanding pigment as far as hiding power is concerned, it is not perfect from many points of view. The crystal form of titanium dioxide known as anatase is a good white pigment of generally good pigment properties. However, being an inert pigment, it is not too easy to disperse in the binder, and since it has a lower refractive index than a second crystal form of titanium dioxide known as rutile, it has a lower hiding power.

Rutile titanium dioxide, while of higher hiding power than anatase, is inferior in color value, having a yellower hue. Rutile is likewise difficult to grind (generally more so than anatase) and even in its freest chalking form is not sufficiently free chalking to give adequate cleanup of exterior surfaces, especially in industrial areas.

ROOM FOR IMPROVEMENT

There is considerable room for improvement in opaque white pigments. Obviously, there is always the possibility of developing a material of even higher refractive index than exhibited by presently known materials which possesses at the same time generally satisfactory pigment properties. The highest hiding value white pigments are inert and hence are rather difficult to grind or disperse in the binders employed. A pigment that is reactive with the binder (for example, basic carbonate white lead) is usually easy to disperse in the binder and accordingly grinds fast and develops its full opacity rapidly. There is much room for improvement in the grindability of present-day high hiding pigments. If such pigments are naturally inert, surface conditioning with the deposition of a reactive layer should be a possibility. Some prog-

ress has been made in this direction.

Desirable features in tinting pigments include high tinting strength, color retention on exposure, ease of dispersion and high opacity. Considerable advance has been made and further advances are to be expected in improving the grindability or dispersability of tinting pigments through various surface treating techniques. Along somewhat similar lines we may look forward to considerable improvement in the furnishing of dustless pigments. This can be accomplished, for example, by pelletizing the pigment to produce a product similar in physical properties to pelleted carbon black.

COLOR RETENTION

As far as color retention is concerned, it is probable that the perfect pigment will never be found. However, the industry would welcome a "phthalocyanine" red and yellow. This does not mean that pigments of the phthalocyanine structure are required, but rather red and yellow pigments exhibiting the characteristics of the phthalocyanine pigments presently known. It should be emphasized, however, that the phthalocyanines are far from perfect. Phthalocyanine blue, for example, is lacking in mass tone and accordingly is best used in tints.

Increases in tinting strength and hiding power may be possible through changes in the crystal form of tinting pigments. For example, molybdate orange has an unexpected high hiding power and tinting strength (in comparison, for example, with chromate oranges). This is attributed to the tetragonal crystal of molybdate orange. Investigation of unorthodox crystal forms of other pigments might well result in interesting and valuable developments.

Extenders have long been the neglected black sheep of the pigment group. At one time many prominent so-called authorities believed that extenders were adulterants pure and simple, put into surface coating materials for the sole purpose of defrauding the public. However, a satisfactory surface coating film for a given set of conditions should have, among other things, at least a minimum hiding value and a proper pigment volume concentration. If a high hiding power pigment is employed, the minimum required hiding value is usually reached long before the necessary pigment volume concentration is achieved. To make up the deficit by simply adding more of the relatively expensive high hiding power pigment is not only wasteful, but also results in a less durable final product.

It is generally recognized that an exterior paint film, to exhibit satisfactory durability, must contain some reactive pigment. The union of the binder with such a reactive pigment is a very firm one, being chemical or quasi-chemical in nature. With the passage of time, the binder gradually contracts, resulting in the establishment of enormous strain forces which eventually exceed the film strength resulting in the production of large checks or cracks which may eventually extend down to the coated surface.

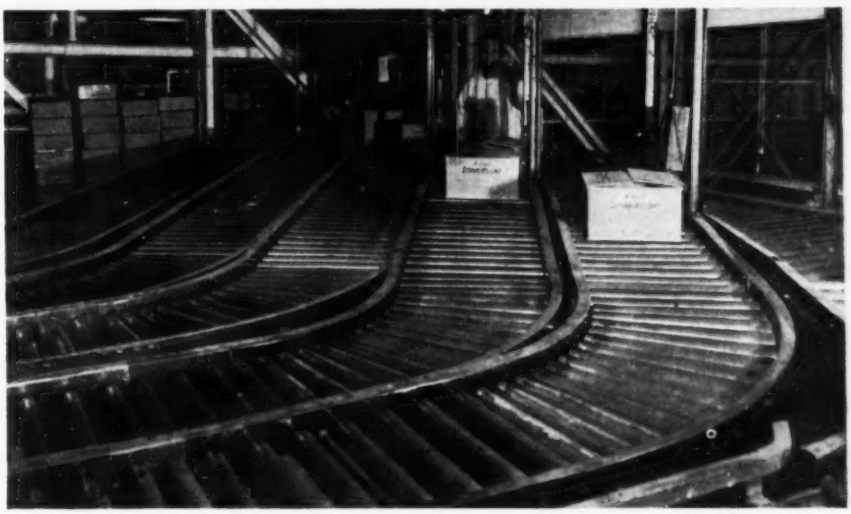
If the film contains an adequate number of extender particles, the gross destruction previously described is prevented or at least postponed for several years. Extenders are usually of comparatively large particle size (for example, below 44 microns, preferably free from fines) and are inert, that is, they do not react with the binder. Accordingly, these extender particles furnish a vast number of "slip planes" throughout the film through which strains are released by the frequent formation of microscopic, non-destructive cracks. This frequent and gradual relief of internal strain forces prevents or postpones the gross destruction of the film.

It is believed that extenders represent a fertile field for future research and improvement. For utmost adaptability they should be of good color, although colored extenders can be employed in tints and darker formulations. For many purposes soluble salts should be absent. The oil absorption should not be too high so that the consistency characteristics of the final formulation will be satisfactory. For reasons already considered, extenders should be inert with respect to the binder. The particle size and shape are important. Generally, particles should be relatively large with fines absent. In some instances both plate-like and acicular particles show special advantages in promoting durability.

BINDERS

As has been mentioned previously, non-convertible binders are now almost invariably used in conjunction with convertible binders, for example, oil modified alkyds. The addition of convertible binders results in films exhibiting greater durability than those produced in the absence of such materials. Even so, non-convertible binders may be considered to be the backbone of the lacquer film.

Nitrocellulose is highly advantageous as a non-convertible binder in that it is compatible with a long list of convertible binders. Unfortunately, however, nitrocellulose produces a film that is quite subject to destruction by fire. Several non-convertible binders are fire retarding, for example, ethyl cellulose. Ethyl cellulose has the further advantage of easy solubility, dissolving completely in a hydrocarbon thinner containing but a few per cent of high power solvent. Ethyl cellulose does not show the wide compatibility with convertible binders exhibited by nitrocellulose, and this is a distinct disadvantage. Cellulose acetate - butyrate (CAB), the development of which was well under way prior to the war, reaching full stature during the war, has, in general, the advantages and disadvantages previously listed with respect to ethyl cellulose. It has a markedly better water and weather resistance than the corresponding single ester, cellulose acetate. In addition, CAB is soluble in a wider variety of solvents and is easier to plasticize than the simple ester. Because of the low reactivity of butyric acid (in comparison with acetic) the preparation of CAB is rather difficult.



To keep better paints rolling from its production lines, the coating industry is constantly looking to chemical makers for better, cheaper, and easier handling formulating materials.

The desirable features of a more nearly perfect non-convertible binder may be deduced from a consideration of the good and bad features of materials now used. Such a future non-convertible binder should be flame retarding, moisture resisting, soluble in inexpensive solvents or solvent mixtures, and compatible with a wide list of convertible binders. Cellulose esters of such dibasic acids as maleic and succinic, either simple esters or mixed esters containing the acetate radical, may have many uses in the future.

Even some of the simplest organic molecules react under suitable conditions to produce solids which may broadly be

termed resins. For example, ethylene, when polymerized under suitable conditions, produces a wax-like solid enjoying wide acceptance as an electrical insulation material. A rubber-like material may be produced by the catalytic polymerization of isobutylene at extremely low temperatures. Since such simple molecules are capable of forming materials which conceivably might be of use as surface coating components, it is evident that among the more complex molecules the number of actual and potential resin formers is legion. Merely to mention them by name would far exceed present space limitations. Accordingly, attention will be rigorously confined to only two classes of resin formers, polycarboxylic acids and polyhydric alcohols. And, even with this drastic limitation, only the briefest consideration can be given to the future possibilities of these materials.

ALKYD RESINS

Undoubtedly, the most important and widely used synthetic resins of the surface coating industry are the alkyds. These are prepared by reacting a polycarboxylic acid with a polyhydric alcohol, the most common pair of reactants being phthalic acid (in the form of the anyhdride) and glycerol. Because of war-time needs of various phthalates for use as plasticizers, insect repellants and the like, the productive capacity for phthalic anhydride has been enormously expanded. We can look forward to a very generous supply of this compound for many years to come and this will undoubtedly greatly accelerate the future use of alkyds. Glycerine is a byproduct of soap making, although a synthesis, apparently not quite competitive ecnomically, has recently been evolved. It is probable that in normal times the supply of byproduct glycerine will be adequate and there always is the possibility of synthetic material at a not much higher price.

As can well be imagined, an enormous amount of work has been done on these classical alkyds, and while the possibilities of their improvement through modification with third components, etc., have not been exhausted by any means, it is evident that the development of each inexpensive polycarboxylic acid and/or polyhydric alcohol serves to add a new string to the resin maker's lute. And, by standing on the edifice of past work with the classical alkyds, the resin maker can bring about the extensive utilization of a new reactant in a surprisingly short period of time.

While it is not argued that the development of new reactants will result in revolutionary advances (although such are quite possible) it is unquestioned that such new reactants will give rise to many "plus factors" in future alkyds. One example of such a possible "plus factor" must suffice. By changing one or more of the classical alkyd reactants it may be possible to produce satisfactory resins which at a given concentration and temperature show a lower solution viscosity than classical alkyds. As a result, an alkyd solution of workable viscosity is obtained having a higher solids content than a solution of a classical alkyd of similar viscosity. The high solids solution is capable of depositing a thicker film in a single coat so that an adequate film is obtained with one coat or at least with fewer coats than previously required. It is believed that this and many other "plus factors" represent the principal rewards of future developments.

Obviously, the development of any relatively inexpensive polycarboxylic acid very probably would be of great value to the surface coatings industry. Too much attention should not be given to the initial cost of the acid. In 1917, phthalic anhydride cost $4.23 a pound; today the price is about 3% of this figure. Improvements in methods of production and the discovery of ever widening fields of usefulness were the synergistic factors resulting in changing this material from a laboratory curiosity to a bulk organic chemical in the space of a few years.

The next several years are expected to see record-breaking civilian consumption of paint.

POLYCARBOXYLIC ACIDS

Only a few of the possible newer polycarboxylic acids can even be mentioned. Considering phthalic acid as *o*-phenylene diformic acid, the next higher member of the series is *o*-phenylene formic-acetic acid (homophthalic acid) and the next, *o*-phenylene diacetic acid. Homophthalic acid may be made by the partial oxidation of indene in the liquid phase—not the vapor phase, for under such conditions, peculiarly enough, phthalic anhydride is produced. *o*-Phenylene diacetic acid may be made by well known synthetic methods from *o*-xylene. *o*-Xylene, previously comparatively rare and expensive, is now separated in large quantities from the reaction products produced during the catalytic aromatization of petroleum naphthas. Again it is interesting to note that *o*-xylene produces phthalic anhydride by vapor phase partial oxidation—a process now in commercial use. Such acids as homophthalic and *o*-phenylene diacetic, when used in the preparation of alkyds, may very possibly convey "plus factors" to the resulting resins.

Yet another possibility may be mentioned. The highly useful maleic anhydride readily combines with butadiene or higher conjugated diolefines, now available in large quantities as the result of the rubber program, to produce (from butadiene) tetrahydrophthalic anhydride which can easily be hydrogenated further to hexahydrophthalic anhydride. This last acid is also obtained by hydrogenating phthalic anhydride itself. Both these acids may prove to be of value in alkyd production.

POLYHYDRIC ALCOHOLS

The same considerations apply to polyhydric alcohols. The development of any relatively inexpensive polyhydric alcohol is potentially of great value. The synthetic tetrahydric alcohol, pentaerythritol, with its four primary alcohol groups, has found wide acceptance in the surface coating industry. This alcohol is prepared from two simple raw materials, formaldehyde and acetaldehyde. By substituting higher aldehydes for acetaldehyde, higher analogues may be obtained, for example, trimethylol ethane, which are now being investigated and used.

Many possibilities exist for the synthesis of polyhydric alcohols. The synthesis of glycerine has been mentioned. By starting with different reactants and employing the same general procedure the production of related polyhydric alcohols is possible. Polyhydric alcohols may frequently be produced by breaking, under suitable conditions, certain organic ring structures, for example, the furan ring. Thus, the ring of tetrahydrofurfuryl alcohol may be broken to produce 1,2,5 trihydroxy pentane in good yield. This may be considered a "stretched" glycerine, that is, a glycerine with two methylene groups between an alpha and the beta carbon atoms.

The polycarboxylic acids and polyhydric alcohols may be employed to modify and improve presently known drying oils. While linseed oil, for example, will not unite with phthalic anhydride except under very severe reaction conditions, it reacts easily with maleic anhydride. The resulting material, which is of high acid number, may be neutralized by reaction with the proper amount of polyhydric alcohol. Similarly, known drying oils react with polyhydric alcohols to give products containing free hydroxyl groups which may be neutralized by reaction with polycarboxylic acids. Obviously, if desired, the high acid number product from the drying oil-polycarboxylic acid reaction may be neutralized by means of the drying oil-polyhydric alcohol reaction product containing free alcohol groups. Drying oils, modified as above described, heat-body more rapidly, dry faster to a

harder film, and exhibit better water and soap resistance than the untreated oils. However, the alkali resistance of films produced from the so-modified oils is usually inferior. It is evident that newly developed polycarboxylic acids and polyhydric alcohols may possibly be of importance in modifying and improving drying oils as described.

In the section on pigments, mention was made of the dependence of hiding power on the refractive index of the solid concerned. More correctly, hiding power is a function of the difference in refractive indices of the solid and the vehicle in which it is dispersed. In other words, hiding power may be increased by increasing the refractive index of the solid or decreasing the refractive index of the binder. A satisfactory drying oil possessing a refractive index lower than those exhibited by present drying oils very probably would be just as efficient in increasing hiding power as some as yet undiscovered super pigment. There are hints that such drying oils are feasible. It is believed that if as much effort were to be expended on this drying oil approach as has been expended on the development of pigment titanium dioxide, the results would be just as revolutionary.

BODIED OILS

During the war, for purposes of oil conservation, the formulation of exterior paints was radically modified. Prior to the war such paints contained a large amount of unbodied oil, perhaps a small amount of bodied oil and a small amount of thinner. During the war, to conserve oil, exterior paints were formulated using a moderate amount of bodied oil, usually blended with some raw oil, together with a relatively large amount of thinner necessary to give the proper viscosity for easy application. Such paints have had such an outstanding performance record that this formulation is being continued post war. Accordingly, there will be a large and increasing demand for bodied oils in the future and a corresponding need for improved methods and means for their production. This includes, among other things, catalysts that really and materially accelerate the heat polymerization of drying oils and improved apparatus for the reaction far beyond the present day pot-on-a-fire technique. A continuous process for the catalytic polymerization of drying oils may be the answer. Such rapidly polymerized oils must have the body and flow properties that characterize acceptable current heat-bodied oils at equal viscosities.

THE ULTIMA THULE

Of course, the ultima Thule of the paint technologist is an oil drying so quickly that a two-coat job is possible with but one setting of the scaffold which at the same time neither skins in the can nor dries on the brush or gun. Such an oil would be received with no little interest by the surface coatings industry.

New Thermal Process for NO

DIRECT COMBINATION OF NITROGEN AND OXYGEN, using a gas flame as the source of heat rather than the flaming arc of the Birkeland-Eyde process, is claimed to be cheaper than present methods of nitrogen fixation.

RESEARCH conducted in the laboratories of the University of Wisconsin during World War II has resulted in the evolution of a process for the preparation of nitric oxide from elemental nitrogen and oxygen, which according to William G. Hendrickson, research chemist for the Wisconsin Alumni Research Foundation, gives promise of being ". . . . by far, the most efficient method of nitrogen fixation and nitrogen fertilizer manufacture yet developed."

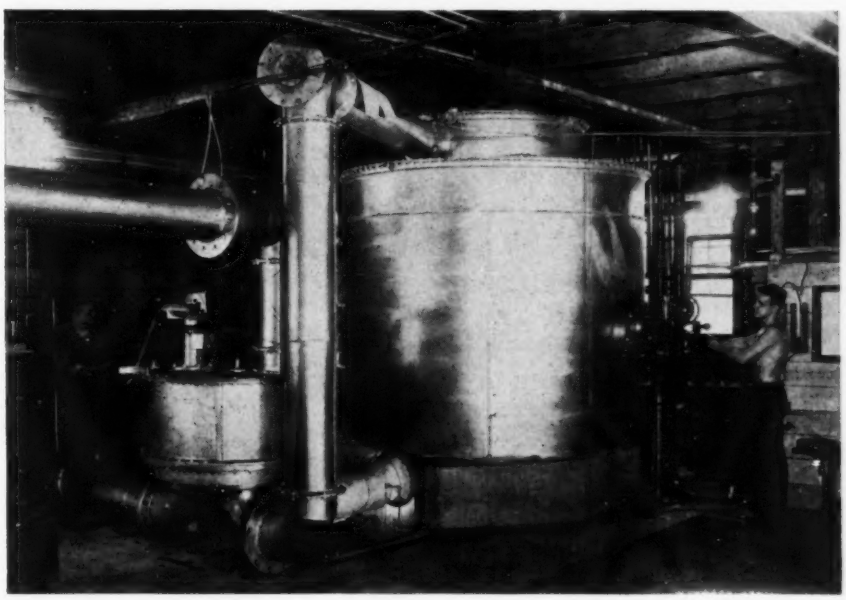
PROCESS

The development of this process has been under the direction of Farrington Daniels, professor of physical chemistry, evolving from fundamental concepts proposed in 1939 by Frederick G. Cottrell. It is, in effect, a modification of the Birkeland-Eyde process which at one time attained commercial status in the Scandinavian countries. Both of these processes involve the direct combination of nitrogen and oxygen—using ordinary air as the raw material—to form nitric oxide which is subsequently oxidized and hydrated to the nitric acid of commerce. The Birkeland-Eyde Process, however, produces a concentration of only about one per cent nitric oxide in the off-gas, making it commercially feasible only where there is an abundance and an extremely cheap source of electrical energy. The Wisconsin process, however, uses fuel gas as a direct source of energy and is reported to produce a concentration of 1.75 per cent nitric oxide in the off-gas, providing a very favorable comparison with the Birkeland-Eyde process. The fixation of nitrogen via the synthesis of ammonia however, is the method used in this country and consequently the true competitor of the new process.

In the Wisconsin process the inlet air is preheated to a very high temperature by passing through a hot bed of refractory pebbles into a large furnace where combustion of the fuel gas, injected at this point, raises the gas temperature to the reaction temperature, 4200° F.

The resultant hot mixture, consisting of the products of combustion, excess air and nitric oxide must then be cooled to below 2800° F. in less than one-tenth second to obtain high nitric oxide recoveries. This cooling is carried out by passing the hot gases through another bed of refractory pebbles like those used for preheating the inlet air. The final temperature of the gases leaving the cooling bed varies from 300-500° F.

The pilot plant which is now operating produces enough nitric oxide to manufacture two tons of 100% nitric acid per day. Another marked advantage of the new process is, according to Mr. Hendrickson, ". . . that the manufacturing unit can be built on a small scale and still operate to an economic advantage."



The furnace at the experimental nitric oxide plant at the University of Wisconsin is about eight feet in diameter and eleven feet high. However, because of insulation requirements the actual working space is only three feet in diameter. This furnace produces enough nitric oxide for two tons of 100% nitric acid per day.

WRITING INK

A Chemical Process Industry Which Tripled Its Output During Wartime

by ROBERT S. CASEY, Director of Research
W. A. Sheaffer Pen Company, Fort Madison, Iowa

YOU AND YOUR FAMILY USED ABOUT 60c WORTH of writing ink last year. Multiply that by 35,000,000 families and you have a $20,000,000 industry consuming a wide variety of chemicals in considerable amounts. The author gives us here an up-to-the-minute picture of the industry—its raw materials, technology, quantity of production, and future prospects.

THE WRITING INK industry will be considered in this paper in its aspect as a chemical process industry. The technologic and economic viewpoints will be stressed, since other publications which have appeared on this subject[1, 2, 3, 4, 5, 6, 7, 8, 9] stressed the history and chemistry of different types of ink, or listed ink formulas.

The Bureau of the Census classifies the writing ink industry under "Miscellaneous Chemical Products," which is a subdivision of "Chemicals and Allied Products."

The writing ink industry is very old. It is also small, and highly competitive. The exact composition of the product is each manufacturer's secret.

RAW MATERIALS

Writing ink consists essentially of a coloring matter dispersed in water. In addition to the color, other materials are added to modify the properties of the solution. The color must be intense, so that the thin line of liquid flowing onto the paper from the pen will be dark enough to be readily legible. This result can be accomplished with solutions of the proper type of colored material in a concentration of from less than one up to about three percent. Such solutions are dilute enough so that the viscosity is not markedly different from that of water.

Ferrous sulphate and tannin dissolved in water have been used for writing ink for many hundreds of years. They form a light, bluish-black compound which after drying on paper gradually becomes darker and insoluble in water. Then, if the writing should be accidentally soaked in water, the characters will not wash out and the record will remain legible. This is the most common type of permanent ink. Soluble dyes, usually in a concentration of less than one percent, are added to such an ink to enhance the appearance and to make the writing initially visible.

Tannin is obtained from nut galls—pathological growths on oak trees resulting from the sting and deposition of eggs by an insect—which are imported from Turkey and China. At one time tannin for ink making was obtained by extracting the galls with hot water as part of the ink making process. In this country at the present time the trend is for ink makers to use the extracted and purified tannic acid.[10, 11, 12, 13]

Proper adjustment of the pH of iron tannate inks is important to prevent formation of the dark colored, insoluble compound while the liquid is still in the bottle or in a fountain pen. A small amount of mineral acid is usually added for this purpose. The pH of commercial blue-black inks is in the range of 1.0 to 3.0.

Extract of logwood from Central and South America with various metal salts, principally chromium, has been used in ink for many years. It is now used much less extensively than iron tannate.

Alkaline solutions containing certain direct dyes are used as inks.[14] Such solutions have a pH of about 12.3.

Soluble dyes are used as the sole coloring matter in washable inks. A small amount of ink is made using soluble Prussian blue, an inorganic pigment in a colloidal state. A description of the properties of such ink has been published.[15]

Purified, finely ground carbon is dispersed in water by the use of protective colloids to make drawing ink. Some is also used as writing ink.

Many water-soluble dyes have been mentioned as suitable for use in inks.[15, 16, 17] The most common is Soluble Blue, Color Index[17] No. 707. It is a triamino derivative of triphenylmethane. Dyes from the following groups are also used: other derivatives of triphenylmethane, azine, thiazine, monoazo, disazo and anthraquinone.

A variety of other materials is also added to inks for special purposes, usually in a concentration of about one percent or less—in some cases much less. A preservative, such as phenol, is usually added to prevent the growth of micro-organisms. A humectant such as glycerine or glycol may be added. Surface-active agents and other materials are occasionally used.

It is beyond the scope of this paper to cover in detail the chemistry of inks. Many formulas have been published and a few are listed below by way of illustration.

Blue-black Ink:
(Federal Specification):[18]

Tannic Acid U. S. P.	11.7 gm.
Gallic Acid U. S. P.	3.8 gm.
Ferrous Sulphate	15.0 gm.
Hydrochloric Acid dilute U. S. P.	12.5 gm.
Phenol, U. S. P.	1.0 gm.
Soluble blue (Color Index No. 707)	3.5 gm.
Water (to make)	1000. ml.

A typical washable ink:

Soluble blue (Color Index No. 707)	5.0 gm.
Glycerine	10.0 gm.
Thymol	0.5 gm.
Water (to make)	1000. ml.

Alkaline permanent ink:[14]

"20 grams of a dye of a general formula: Aminonaphtholsulphonic acid (azo-*p*-diamine-azo-*m*-diamine)$_2$, are dissolved

in 950 ccm. of distilled water. After cooling and filtering 50 ccm. of 2N sodium hydroxide solution are added and the whole is made up to 1000 ccm."

TECHNOLOGY

The manufacture of writing ink consists of purifying the water, dissolving the ingredients, treating and purifying the resulting solution, and packaging.

The water requires purification because of its possible effect on the pH of the ink, and the bleaching effect of any residual chlorine on dyes. Also, the presence of salts affects the solubility of many dyes, and some metal ions form insoluble compounds with certain dyes. The purification may be effected by distillation or ion exchange. In some localities the water has low enough solids content to be used without treatment.

The water is next transferred to the mixing tank where it may be heated to facilitate solution of the other materials. The mixing is done by paddle- or propeller-type stirrers. The viscosity and density of ink are so nearly the same as for water that the power requirements for mixing may be considered the same as for the latter.

The ink may then be aged for a number of days and is finally decanted, filtered, or centrifuged before going to storage and packaging.

Most tanks for ink mixing and storing range in size from several hundred gallons up to about five thousand gallons.

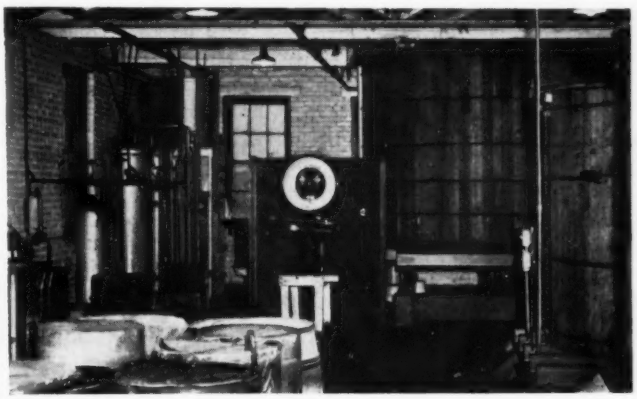
Writing ink is a very corrosive medium, a fact which dictates careful choice of materials of construction for handling equipment. Wood, ceramics, certain plastics, and acid-resisting alloys may be used for inks of medium and low pH. Inks of high pH can be handled in chemical stoneware, rubber, and most metals and alloys (with obvious exceptions). In general, for a given amount of reaction between ink and too reactive construction materials, contamination of the ink is more significant than the rate of destruction of the material. Iron-tannate and alkaline inks are sensitive to change in pH as a result of such reaction, and many dyes are changed in shade or intensity of color or in solubility. Some plastics display a selective adsorption for some ingredients of inks.

Wood is the most common material for tanks. Stoneware, Haveg, and glass- and rubber-lined steel are also used. The latter group can be used for pipes and fittings, as also can hard rubber, stainless steel, Pyrex, porcelain, Saran and laminated phenolics, such as Micarta and Synthane. Pumps constructed of some of the above materials are available.

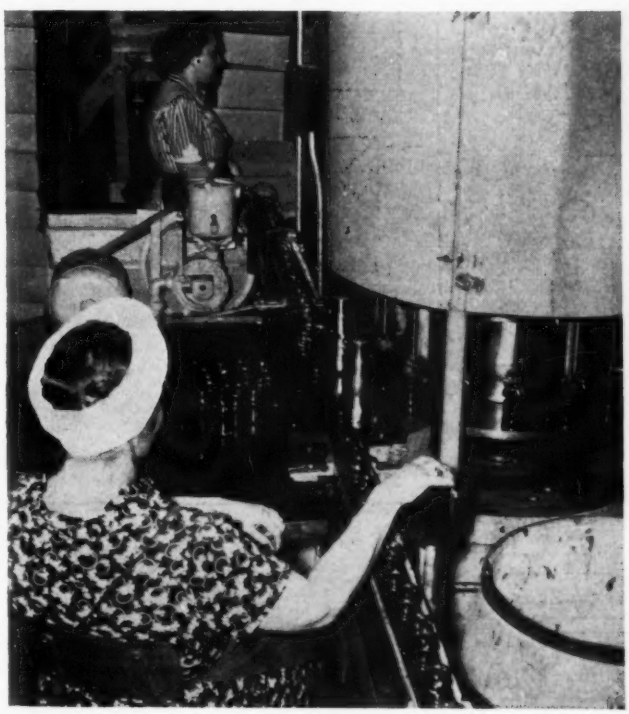
Stainless steel is excellent for parts in contact with ink which must also resist high mechanical stresses and must conform to close dimensional tolerances. Particularly good for chemical inertness to writing inks are stainless steels high in chromium and nickel and stabilized with molybdenum or titanium.

The packaging is accomplished by a continuous series of automatic or hand fed machines. The empty bottles are removed from the corrugated fiber-board shipping boxes and placed on the intake conveyor. The first machine fills the proper amount of ink into each bottle. Some machines draw the writing fluid from the supply into the bottle by vacuum so that if the bottle has a hole in it, it will not fill.

The next machine selects a cap from a hopper, applies it to the top of the bottle, and, in the case of screw-cap bottles, screws down the cap and tightens it to a predetermined tension. The next machine takes a label from a holder, applies gum to the label, and places it on the bottle. Then a machine draws individual cartons from a magazine, folds them to their final form, inserts a bottle in each carton, with or without a folder circular, tucks in the top and bottom flaps, and discharges the individually cartoned bottles. Then they may or may not be packed into small counter display boxes, and are finally packed in shipping boxes, usually the same corrugated fiber-



Ink is mixed in tanks ranging in size up to about 5000 gallons.



Filling machine. Some use suction so that leaking bottles will not fill.

Here caps are automatically screwed on and gummed labels applied.

board boxes in which the empty bottles were received.

The capacity of such production lines ranges from one or two thousand up to more than seven thousand small bottles per hour, so that a fully automatic high speed line can produce over 50,000 small bottles per eight-hour day.

Bottles, some raw materials, and finished product are transported on gravity and power conveyors for continuous operations. Pallets and lift trucks are used for intermittent handling such as moving finished product from the end of the production lines to storage, to the shipping line, then to loading, etc.

ECONOMICS

Economically, the package, handling, storing, and shipping are by far the most important parts of the manufacture of writing ink, because they represent a very large fraction of the total cost. The material cost of the liquid ink is a much smaller fraction. Since this industry produces a consumer item which is highly competitive, merchandising considerations and national advertising play a large part in its marketing. A convenient and attractive package is necessary to assure dealer and consumer acceptance. The expenditure which may be made for this purpose is limited by the fact that writing ink sells for a relatively low price per unit. The 1¼- to 2-ounce size range, selling for 10 and 15 cents at retail, accounts for a large fraction of the total volume. The other principal sizes are 4 ounces for 25 cents, a pint for 75 to 90 cents, and a quart for $1.25 to $1.50.

Although the ink package is finished and ready for the ultimate consumer, the manufacturer does not sell directly to him but to retail dealers and to wholesalers, who in turn sell to retailers and industrial users. Table I gives data on the distribution of writing ink manufacturers' sales.

Table II shows the manufacturers' value of such sales. The retail selling value would be approximately twice as much, since the dealers' and wholesalers' discounts, which vary with the size of the shipments, stock carried, etc., average somewhat over 50%.

There have been no data collected by the Census Bureau of the Department of Commerce since 1939. The writer estimates that the annual aggregate value of writing ink was $5,500,000 in 1942,

Table I

PERCENTAGE DISTRIBUTION OF WRITING INK MANUFACTURERS' SALES
(U. S. Department of Commerce data)

Group	*1929*	*1935*		*1939*
Wholesalers and jobbers (incl. mfgr. own wholesalers and branches) and Export intermediaries:	57.1	57.9	61.2	58.0
Retailers (including chains):	37.5	36.3	30.6	28.9
Industrial, etc. users:	5.4	5.8	8.2	7.8
Export (direct to buyers in other countries):				5.3

Table II

VALUE OF WRITING INK PRODUCTION*
(U. S. Department of Commerce data)

Year	*Total Products*	*Writing ink*	*Writing ink secondary prod. of other indus.*	*Writing ink Aggregate Value*
1859	$119,578			
1869	366,473			
1889	1,128,307			
1899	1,292,759			
1904	1,881,038			
1909	2,505,414			
1914	2,783,642			
1919	6,433,941		$1,037,676	
1921	4,980,148		179,455	
1923	6,107,379		685,637	
1925	6,084,315	$4,853,003	457,375	$5,310,378
1927	5,342,027	3,301,411	1,431,351	4,732,762
1929	4,594,974	2,921,386	1,748,602	4,669,988
1931	3,535,121	1,891,023	1,650,649	3,541,672
1933	2,522,118			
1935	3,381,907	2,090,793	1,554,981	3,645,774
1937	3,475,600	2,159,002	1,676,977	3,835,979
1939	2,951,259	2,033,549	1,955,839	3,989,388

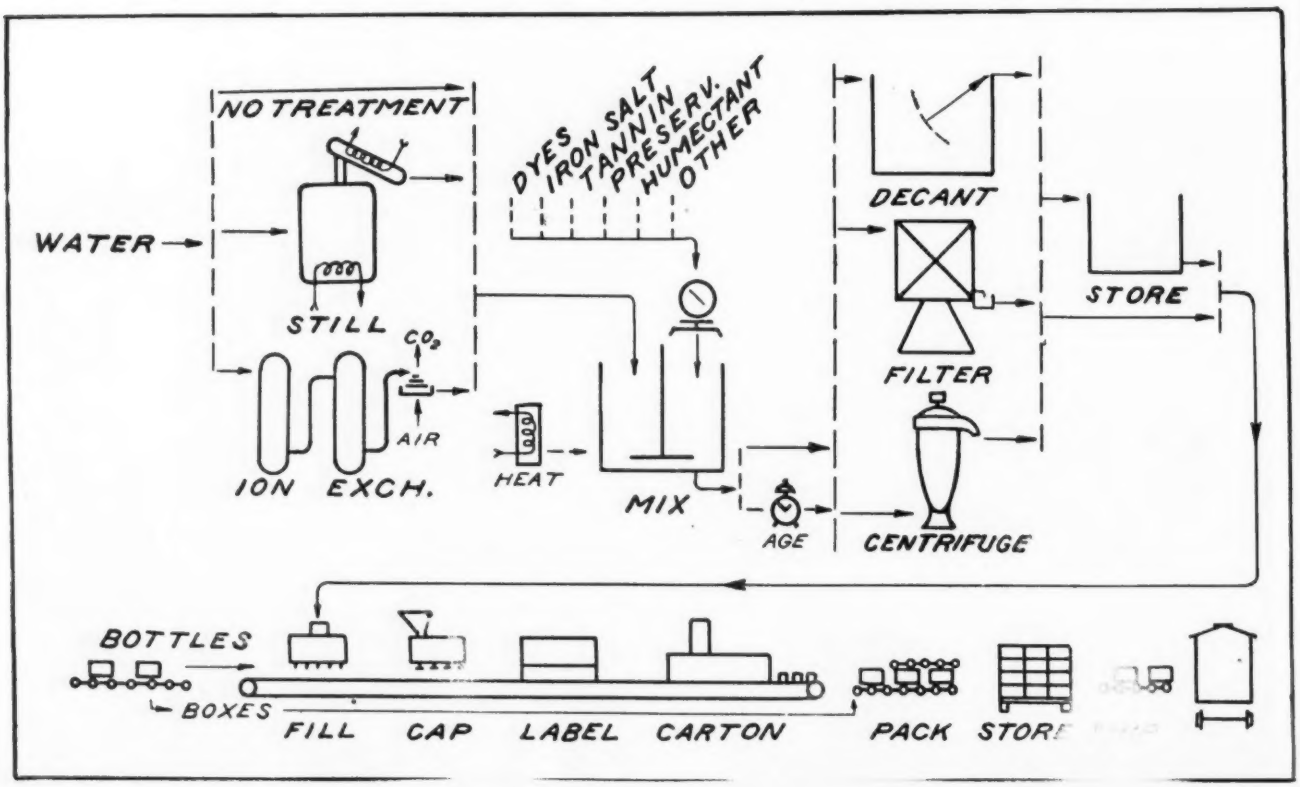
* Since 1919 only establishments making more than $5000 worth of products per year are included. Previously those making more than $500 were included.

There have been no data collected by the Census Bureau of the Department of Commerce since 1939. The writer estimates that the annual aggregate value of writing ink was $5,500,000 in 1942,

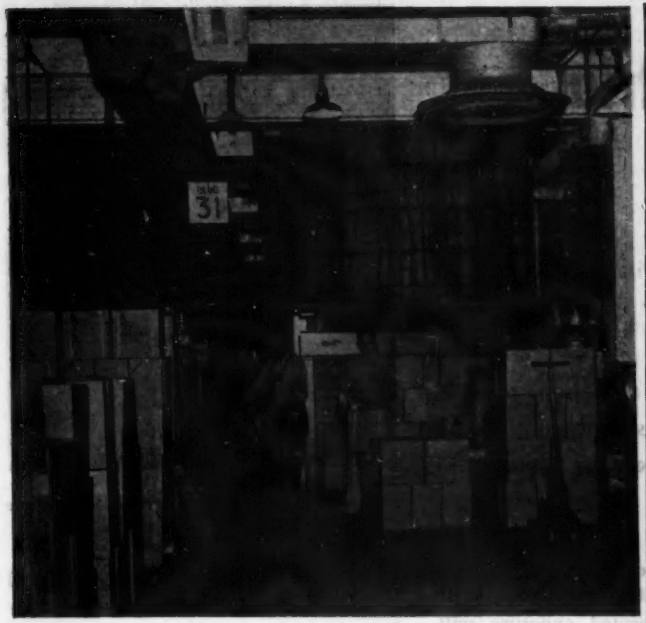
Table III

IMPORTS AND EXPORTS OF WRITING INK
(U. S. Department of Commerce data)

Year	*Imports*	*Exports*
1941	$799.	$488,465
1942	664.	252,002
1943	5946.	247,856
1944	4516.	542,142



Flow sheet of writing ink manufacture.



Above, shipments being readied for export—a large item in the industry.

Cartoning and sealing machines (right) prepare bottles for shipping.

$9,500,000 in 1943, $11,000,000 in 1944, and about $10,000,000 in 1945.

Writing ink packed ready to ship has large bulk and weight relative to its value. The ratios are about 15 cents per pound, manufacturer's net value, and 40 pounds per cubic foot.

Another ratio is 0.3+, gallons per dollar. The average capacity among the total number of bottles sold is about 3 fluid ounces per bottle, and about thirteen bottles per dollar of manufacturers' sales.

CURRENT TRENDS

"The writing ink industry cooperated with the armed services in promoting letter writing and publicizing the V-mail service, and developed writing inks for V-Mail which give good contrast when photographed. This will probably accelerate the use of such inks for the microfilming of checks and other business records.

"Recent years have been characterized by shortages of most materials used by this industry—glass, metal caps, fiberboard and chemicals such as tannic acid, humectants and dyes. This has been accompanied by a several-fold increase in demand for finished product by the armed services and civilian users.

"All demands were met by the use of alternate and less critical materials without sacrificing quality of product. In some instances improvements were achieved."[19]

A bottle of ink is viewed as a prosaic item by the consumer who considers only its utilitarian properties, or, more likely, gives it no consideration at all unless it fails to give satisfaction. Consequently there has been no style trend in this industry. Attempts to merchandise fancy bottles, perfumed ink, etc., have never been strikingly successful. There is evidence, however, that new colors of ink in addition to the conventional blue, green, and purple, will be popularized during the next few ytars.

Continued research and the development of new and more accurate methods of testing ink can be expected, and should result in additional improvements in stability, in inertness toward steel and fountain pens, in writing and flowing properties, and in improved safety in the making and keeping of records.

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German Plastics

The I. G. Farbenindustrie's operations in the field of thermoplastics are reported by United States investigators as accounting for 90 per cent of all German activities in this field, and are discussed in detail in a 95-page report now available for general distribution, the Office of the Publication Board states.

The report, No. 1069, is entitled, "Technical Report on the Manufacture of Thermoplastics in Plants of the I. G. Farbenindustrie, A. G., Germany." It was prepared by Ray H. Boundy and R. Leonard Hasche on behalf of the British Ministry of Miscellaneous Chemicals and the United States Technical Industrial Intelligence Committee.

The report presents details on the plants, materials and processes used by the I. G. Farbenindustrie in manufacturing vinyl chlorine, vinyl acetate, vinyl ethers, styrene, vinyl corbazole, caprolactam (a type of nylon) and hexamethylene diisocyanate. Included also are data on the manufacture and fabrication of polyvinyl chlorine, chlorinated polyvinyl chloride, polyvinyl acetate, polyvinyl acetals, polyvinyl ethers, polystyrene, polyvinyl carbazole, polyacrylates, polyisobutylene and cellulose acetate, as well as on lyafol fabrication and perlon spinning.

The Dividends of Industrial Disease Prevention

by BRAHNA CHALEFMAN HUTCHINS, Assistant Director
Safety Research Institute, New York

Workman dons suitable respirator before entering tank for cleaning or repair.

ASIDE FROM THE OBVIOUS humanitarian and public relations reasons, utmost precautions against poison hazards in chemical plants can be justified on a dollars and cents basis. It is possible to make some close estimates of the cost of industrial chemical diseases, and the figures are strikingly high.

IN 1944, a year characterized by a growing consciousness of the economic importance of protecting the health and safety of workmen, the incidence of industrial accidents and diseases actually increased in the chemical field. The industry was rated as the seventh most safe in 1943, and fell to eleventh place in 1944.

While the dollar-and-cent value of an accident prevention program has been clearly indicated by war production experiences, the value of industrial disease prevention has often been ignored. An economic analysis of the advantages and costs of prevention of industrial illnesses may therefore be particularly timely.

One authority has estimated that the average industrial accident costs $66.14, whereas the average cost of an industrial illness is $144.35, in actual medical expenses and compensation payments. In spite of this striking difference, 85% of the nation's industrial plants, covering 60% of workers, are well equipped to prevent industrial accidents and care for their victims, but lack a parallel program covering industrial illnesses. In some cases, this situation may be justified by the low frequency of industrial illnesses as compared with accidents. In the chemical industry, however, the industrial disease problem is comparatively large, the two major threats being dermatitis and injuries resulting from the inhalation of vapors of volatile organic compounds.

In attempting to estimate the over-all costs of industrial disease, it is necessary to differentiate beween cases of frank, or unmistakable, illness and the less obvious but equally real borderline cases, in which the health of a workman is adversely affected by his working environment but he cannot be described as definitely ill.

CLEAR-CUT INDUSTRIAL DISEASES

Contact dermatitis is the most common of the industrial diseases and is generally considered to be today's gravest industrial hygiene problem. Nearly all chemicals are injurious to the skin in some degree. Some are directly corrosive, causing ulceration, "burns," eczemas and similar out breaks, while others are irritating or drying, so that repeated exposure will leave the skin red and roughened, open to infection. Many organic chemicals are able to act as allergens. Some individuals can become so sensitive to a chemical that acute skin reactions follow exposure to even a trace of the offending substance.

While skin diseases are rarely fatal, they are usually difficult to cure and are sometimes prolonged for months by secondary infections or the development of chronic conditions. During this period the sufferer is frequently absent from work and spends a total of many hours in the plant medical department. His rate of production, when he is on the job, is likely to drop. His morale may deteriorate and co-workers in turn may be affected by his poor mental and physical condition.

The cost of a single serious case of dermatitis can readily be estimated. On the basis of data assembled in Wisconsin last year, each compensable case of dermatitis costs, on the average, $93 in compensation payments. To this must be added a loss of shift productive capacity which has been estimated at about $12 for each day a workman is absent. A minimum absence of ten days will thus cost $120, bringing the measurable average expense of a single case of dermatitis up to $213, excluding consideration of more tenuous factors such as lowered individual efficiency on the job and decrease in morale.

It is almost impossible entirely to eliminate industrial dermatitis in the chemical industry because a certain percentage of new workmen or those freshly exposed to a new chemical will almost invariably become sensitized to it. The resultant skin reaction can be cured only after the man is transferred to work where he is not exposed to the material to which he is sensitive. These allergic-type reactions, however, comprise but a small fraction of industrial skin disorders. Practically all of the remainder can be eliminated through two simple precautions: the revision of work procedures to prevent or limit skin contact with the chemical; and provision of protective gloves and other garments to be worn when necessary. Special protective creams, each formulated to resist a particular group of chemicals, are also available. Facilities for frequent, thorough washing with warm water and mild soap are important in preventing skin disorders.

The second serious health danger for workers in chemical industries is vapor inhalation. Excessive inhalation of the vapors of many organic chemicals in common industrial use may result in effects ranging from serious acute intoxication with possible death, through less serious chronic systemic effects, to mild disturbances that are very difficult to detect. Hundreds of volatile materials are used in large amounts by the manufacturers of chemicals and intermediates and in related industries. Manufacturers of refrigerants, pharmaceuticals, dyes, synthetic fibers, plastics, lacquers and paints, cosmetics, perfumes, and fumigants, as well as the industrial users of these products, all employ organic liquids in sizable quantities. These chemicals are also employed in other fields, such as leather tanning, bleaching, canning, textile spinning and weaving, and metal working.

Impressive costs accrue quickly as a result of a frank chemical poisoning in an industrial worker. Compensation payments may readily amount to a thousand dollars or more, and if the illness is fatal further payments are necessary. Law suits are not unusual in this field and compensation insurance rates are unsteady, ready to increase at the slightest indication of a growth in the frequency of demands for indemnities.

Sometimes injury or illness on the part of one worker may cause others in the department to suffer imaginary sickness, with serious interruptions to production as a consequence. In one plant where a worker fainted as a result of accidental

exposure to the fumes from a chemical, several others collapsed and a number had to be helped to the first aid department. Within two hours after the incident occurred, fifteen employees in other parts of the plant and one girl in a building across the street reported feeling ill. All the reports were checked and no connection with the incident was found except that there had been gossip about it.

In another plant, a filling operation was carried out in several steps, all but one of which were provided with mechanical ventilation. One man became ill and his condition was attributed by his personal physician to chemical poisoning. Within a short time, "any number" of other employees working where they could not possibly have been exposed to the chemical were sick.

Cases of chemical poisoning may have other costly incidental effects. The general attitude of the workers to the plant and their jobs may be influenced, resulting in lowered morale, decreased productivity, and increased labor turnover. Moreover, in a booming labor market, where there are more jobs than "takers," jobhunters will shy away from any plant with a reputation for poor working conditions or a bad record on employee health.

DISCOMFORT & "THRESHOLD ILLNESS"

The inhalation of air containing even moderate concentrations of organic chemical vapors, particularly when protracted or frequent, will result in the development of marginal chemical poisoning, with mild symptoms such as persistent headache, nausea, loss of appetite, "nervousness," excitability or depression, and lethargy. Workmen suffering from these symptoms of chemical intoxication will rarely recognize themselves as ill or they may attribute these disturbances to other causes, such as lack of sleep or bad food. If the condition is common to all the members of a work crew, its significance may actually be minimized because of its familiarity.

While the costs of serious illness, disability or death due to industrial chemicals may be more dramatic, the expenses connected with threshold chemical illness are as a whole probably much greater, because these conditions occur so frequently. Their costs cannot always be readily recognized, since they do not appear on the balance sheet under a single heading.

Hidden losses result from the poor spirit and physical depression that characterize workers suffering from marginal chemical poisoning. A prompt increase in absenteeism is likely to appear in the affected group. The expense incurred through one man's absence for one day is sometimes difficult to estimate, but one detailed study was made which showed that five cases of absenteeism in a particular factory cost $4,439. There is likely to be a quicker labor turnover, which has been estimated to cost from $150 to $400 per man. Continuity of production may be interrupted and individual production rates will drop.

Poisons that affect the nervous system, as do certain of the organic chemicals, tend to impair the powers of judgment and coordination. This leads to errors and accidents, often apparently unconnected with the true source of trouble.

Even where exposure to chemicals is not sufficient to cause threshold illness, losses may result from employee discomfort caused by unpleasant odors, dirt, poor ventilation, etc. There have been a number of studies showing improved production resulting from an improvement in the general comfort and pleasantness of working conditions. In one instance, simply raising the temperature of the workroom a few degrees resulted in greater work output per man, less absenteeism and an improvement in quality of work.

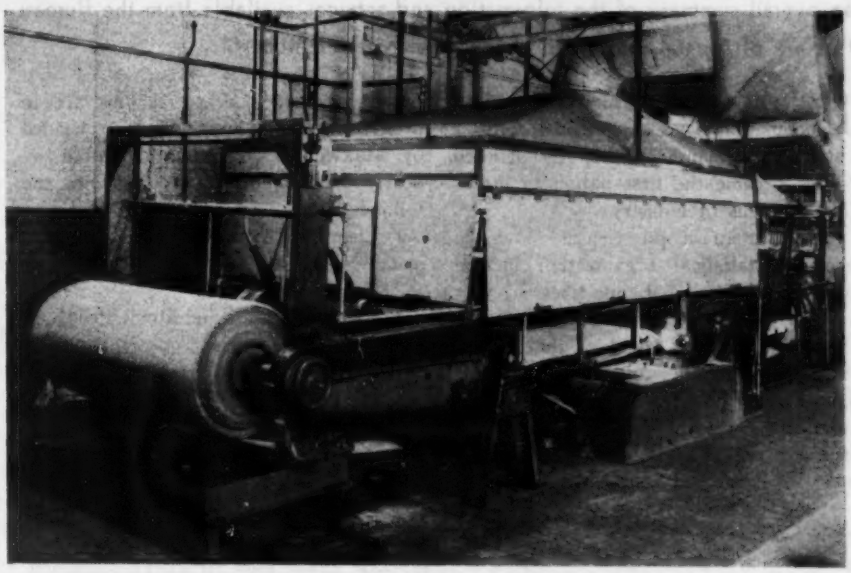
The evaporation of volatile chemicals is not only expensive from the point of view of the health and productivity of plant personnel; it is also wasteful. Many pounds of valuable solvents are lost daily through evaporation in plants where precautions are not observed. In one varnish-making plant, for example, it was estimated by the management that ten per cent of all the thinner purchased is lost by evaporation from open thinning operations.

The ideal situation, from all points of view, is that in which the complete process is carried out in a closed system. Where this is not possible, the advice of a ventilating engineer or industrial hygienist will be needed to determine the most effective way to solve each particular problem so as to protect health and conserve solvent. General ventilation must usually be supplemented at the source of the vapor by down draft or lateral slot exhaust ventilating systems. In every case the work procedure must be carefully examined from the point of view of the vapor hazard; occasionally a revision of work procedures alone is sufficient to transform a dangerous environment into a safe one.

Protective equipment and installations must be tested and inspected at frequent intervals in order to ensure that they are operating properly. Testing procedures are simple, but trained men are required to evaluate the results in terms of actual exposure and hazard. A running record of the results of these analyses will be invaluable as evidence in case an ill-considered complaint is raised concerning working conditions.

The measures necessary to prevent intoxication by contaminated workroom air may be somewhat more costly than those required for the prevention of industrial dermatoses, but the health hazard is greater in the former case and the resulting security even more valuable. The effectiveness of such a control program is evidenced by the fact that in one plant where a health protection program was instituted, the insurance premium, which had originally stood at $3.78, dropped promptly to $3.02 and then fell again to $1.43.

The actual costs of illnesses resulting from chemical poisonings, the savings that result from avoiding these illnesses, and the capital investment required to realize these savings, can all be estimated with some accuracy in terms of dollars and cents. Some of the other equally important results are less readily evaluated. The standing and reputation of a plant, for example, or even of an entire industry, are injured by a poor accident record. On the other hand, healthful working conditions enhance the reputation of both the plant and its management.



(Courtesy of Goodyear Tire & Rubber Co.)

Exhaust hood designed to move 9,000 cu. ft./per gallon of solvent evaporated. When flaps are down, flow of air is from dip tank toward hood opening. Note fire extinguisher horns.

NO. 3 of a series on
INFORMATION SOURCES FOR CHEMICAL MARKET RESEARCH

Services and Publications of the BUREAU OF THE CENSUS

by RICHARD M. LAWRENCE
Development Department, Atlas Powder Company
Wilmington, Delaware

LONG ONE OF THE MOST FRUITFUL sources of data on production and consumption of chemicals and other commodities, the Bureau of the Census is now working on some important postwar additions and changes in its statistical services. An outline of this future program is presented here, along with an overall summary of the information and services available from the Bureau that are of special interest to chemical market researchers.

IN 1810, when Census activities on population were augmented with a canvass of manufacturers, the United States became the first nation to establish a census of industry.

The Bureau of the Census, now the greatest statistical organization in the world, compiles and publishes a vast volume and variety of data measuring the magnitude and trend of the myriad items which together constitute the American Economy. It truly provides a detailed and continual X-ray picture of the structure and fiber of the nation's activities. A large number of the more important series of figures run back for many years. Many series are taken at annual, quarterly, or monthly intervals. For many items, figures are broken down to show regional, state and city subtotals.

Invaluable bench-mark that it is, the biennial Census of Manufacturers normally provides statistics that are history, when published, albeit modern history, so the Census Bureau is now pushing a great "current history" program and hopes to further conquer time lags through the use of many "forecasting items" like finished inventories and unfilled orders.

ORGANIZATION

J. C. Capt, Director of the Census Bureau, has a staff of 3,500 full time employees, plus 1,600 part time field workers. This legion of fact-finders is substantially increased when big special jobs are in progress. The Industry Division, headed by Maxwell R. Conklin, is staffed by nearly 500 employees, grouped into the following four sections:

1. Chemicals, Forest Products and Nonmetallic Minerals.
2. Textiles and Foods.
3. Primary Metals and Metal Products.
4. Plant Operations.

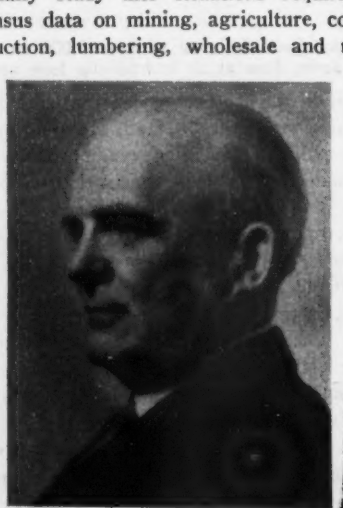
J. A. Van Swearingen heads the first of these sections, with a staff of about 100, of which 24 devote all of their time to chemicals, fats and oils, and plastics.

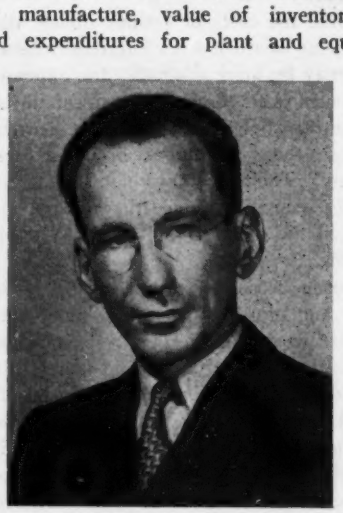
Chemical market researchers are primarily concerned with statistics on manufacturing and foreign trade but will occasionally study into situations requiring Census data on mining, agriculture, construction, lumbering, wholesale and retail distribution, population, housing, employment and municipal finance.

The annual *"Statistical Abstract"* contains summarized statistics on all subjects covered by the Census and other statistical departments of the government. It includes data on manufactures, mining, commerce, prices, labor, agriculture, power, transportation, banking, weather, government finance, etc. As the *"Statistical Abstract"* cites hundreds of data sources, it gives many valuable leads for further research.

PRODUCTION STATISTICS

For two decades prior to the War, the Census Bureau biennially published the comprehensive "Census of Manufactures" report covering many thousands of products, with figures on the output, value and number of establishments. For the major industries, figures are shown for number of establishments, employment, wages paid, cost of materials and supplies, cost of fuel and energy, installed horsepower, value of output, value added by manufacture, value of inventories, and expenditures for plant and equip-





J. C. Capt, director of the Bureau of the Census, and J. A. Van Swearingen, Industry Division Economist, who has been closely identified with the Bureau's program on chemicals.

The author acknowledges with gratitude the assistance and advice of J. A. Van Swearingen, Industry Division Economist, Bureau of the Census, in the preparation of this article.

ment. For industries and certain important products, sub-totals are shown for states, cities and industrial areas. For a number of industries, separate figures are shown for each of the principal raw materials consumed. For the bulk of the items covered by the "Census of Manufactures," comparative statistics are shown for both the current and earlier Census years.

The 1939 Census of Manufactures comprises three volumes. Volume I presents summarized data on 446 industry groups and subgroups, classified by size, as measured by (1) value of product, (2) value added by manufacture, (3) number of wage earners, and (4) amount of wages paid.

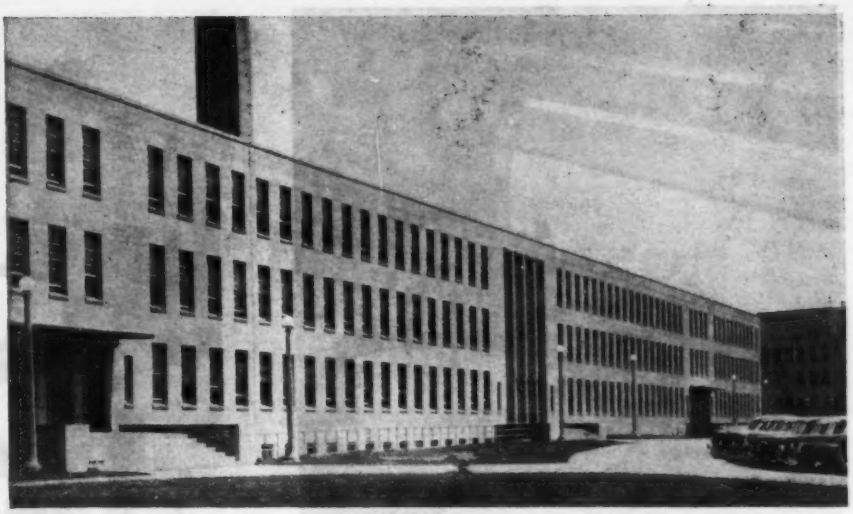
It also includes two very useful tables: (1) a list of 274 different materials, showing quantities and costs of amounts consumed in 143 selected industries (e. g., corn sugar, in each of 28 industries) and (2) a list of industries showing quantities and costs of each of the principal materials consumed.

Volume II, in two parts, totals nearly 1,600 pages of detailed industry and commodity figures. Group 9, "Chemical and Allied Products," for which value of products totaled 3.7 billion dollars, comprised 36 industry classifications, such as Soap and Glycerine, Rayon, Paint, Drugs and Medicines, Fertilizers and Explosives. Detailed figures for 418 individual items are shown in chapters devoted to Group 9 industries. In addition to quantity and value figures, the number of plants in each state are shown. For a number of major items, separate figures are shown for quantities sold and quantities consumed in the plants where produced.

Volume III presents industry figures for the individual states and territories.

Excellent examples of the statistical pictures which can be developed from Census data may be found in T. J. Krep's "Economics of the Sulfuric Acid Industry" which presents tables showing the battle between brimstone and pyrites and the contest between the chamber and contact processes, as well as trends in production in different parts of the country and trends in the major outlets. Census figures of the last 25 years record the displacement of bleaching powder with liquid chlorine and the growth of electrolytic caustic soda as it challenged and finally exceeded that made by the lime-soda process. Many other developments, less dramatic but commercially important, have been first revealed in the figures of Census reports.

Revealing its increasing recognition as an indispensable tool of business, one of the industry volumes of the latest (1939) Census of Manufactures required a second printing in 1945. Part of this unusual demand was doubtless due to efforts of the Committee for Economic Development and other organizations in developing rational postwar planning goals based on calculated relationships with prewar industry levels.



Front view of the Bureau of the Census building on the outskirts of Washington. The Bureau has a full time staff of 3,500, plus 1,600 part time field workers. The Industry Division is staffed by nearly 500 people, of whom about 100, under the direction of J. A. Van Swearingen, devote their time to chemicals, forest products and non-metallic minerals.

The decennial *"Census of Mineral Industries,"* last taken for 1939, and the quinquennial *"Census of Agriculture,"* last taken for 1940, are comprehensive volumes roughly similar to the *"Census of Manufactures."* The *"Census of Mineral Industries"* will be taken again for 1946. Work on the *"Census of Agriculture"* for 1945 is now in progress.

FACTS FOR INDUSTRY REPORTS

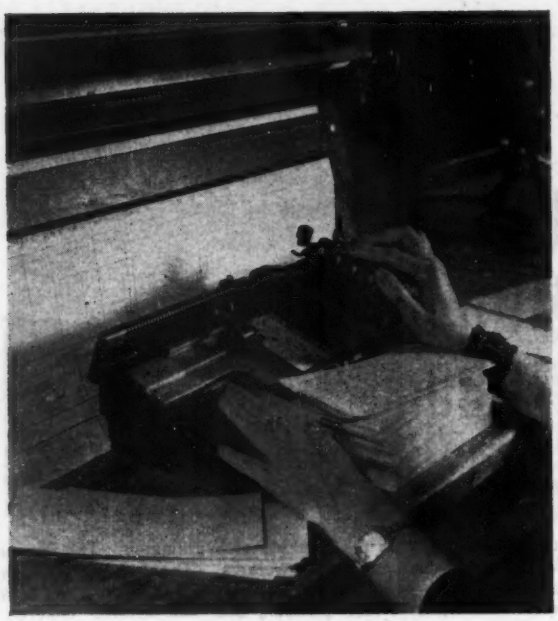
For chemical market researchers, the greatest statistical event in many years was the establishment of the "Facts for Industry" series of reports through cooperation of the War Production Board and other government agencies. This series of reports shed a particularly welcome light into the statistical dimout of the war years, from which it marked the first emerging step. For many products, previously censored monthly figures for 1941, 1942, and 1943 were released early in 1944 and have since been issued on a monthly basis. In addition to production statistics, the "Facts for Industry" reports include data on both consumption and stocks (in plants where produced). One report series (51-1) presented U. S. War Production Indexes.

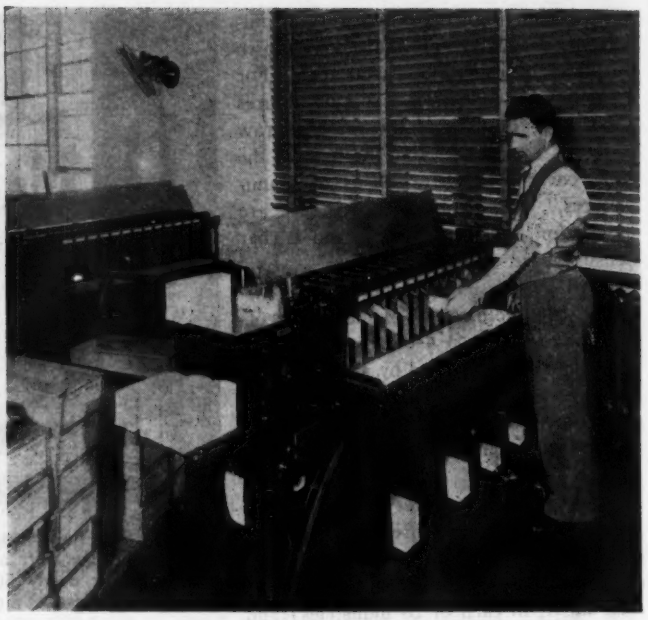
The three principal chemical series, which cover more than 100 individual products, are 6-1, 6-2, and 6-3. These respectively present inorganic chemicals (Census Bureau data), synthetics (Tariff Commission data), and chemicals related to mining, coke oven, and smelter processes (Bureau of Mines data).

In the Series 6-1, the first issue (6-1-1) presented monthly figures for 1941, 1942, and 1943 on about 40 inorganic chemicals, listed plant locations by states, outlined the production processes, listed the major uses, and gave comparative 1939 data wherever available. Later issues, numbered 6-1-2, 6-1-3, etc., presented new monthly figures. Early in 1945, eighteen more chemicals were added to the list and their historical record was published in "Series 6-1-1, Supplement 2" in August 1945. Since V-J Day, Series 6-1 has been carried forward on a regular monthly basis but the number of products has been considerably reduced and data on consumption and stocks are omitted. A future release will contain a complete record of industry operations during the war. This will comprise revised monthly figures for all items currently published, together with information for a few important inorganic chemicals heretofore withheld for security reasons.

For "The Chemical Barometer," sulfuric acid, the Series 6-1 reports have presented an excellent statistical picture, showing monthly production of both chamber and contact acid, with separate figures for fortified spent acid and new acid, also producers' own consumption and stocks. A special Sulfuric Acid report (Facts for Industry Series 6-1-1, Supplement No. 1, July 1945) recapitulated the monthly figures for 1943 and 1944 and also presented breakdowns of the annual figures for 15 market areas. A United States map delineates these 15 areas and shows locations of the 170 plants, indicating whether contact or chamber. A directory of these plants and a discussion of the sulfuric acid situation was presented in *Chemical & Engineering News* (**32,** No. 13, 1154, 1945) by Alonzo White, III, of the Chemicals Bureau of the War Production Board.

A splendid feature of the "Facts for Industry" series is the newly adopted practice of expressing figures on the 100% or anhydrous basis wherever possible. The writer likes to think that this de-





Card punch machine and mechanical sorter used by the Bureau of the Census in its tabulating system.

velopment may represent propagation of the progressive practice, long followed in the explosives industry, of expressing all strengths of sulfuric acid on the 100% basis, while other industries preferred to perform their complex thinking in terms of 50° Baumé acid, to which figures could be converted about as easily as adding up a column of Roman numerals!

In addition to the chemical reports just mentioned, chemical market researchers will find much of interest in the "Facts for Industry" series on plywood, pulp and paper, glue and gelatin, glass containers, aluminum, magnesium, enameled ware, plastic materials photographic film, and cotton and rayon finishing. Also of interest are the reports on such lines of equipment as pressure vessels, heat exchangers, air conditioning and refrigeration equipment, water-softening apparatus, X-ray equipment, storage and dry cell batteries, mining machinery, and safety equipment. Many of the reports include charts depicting the monthly trends and some present situation maps.

The "Facts for Industry" report on Softwood Plywood (Series 16-1) includes a table on consumption and stocks of adhesives, with separate figures on casein, soy bean, phenolic resin, urea resin, tapioca and other adhesives.

In June 1945, the monthly report on plastics (Series M19H), previously limited to nitrocellulose and cellulose acetate, was expanded to include all other major types of plastic materials, with separate figures for molding compositions, sheets, rods, tubes, synthetic adhesives, and laminating materials. Forthcoming releases will also contain statistics on the consumption of principal plastic materials. Beginning with the first quarter of 1946, one of the new series will cover the numerous important plastic materials used in protective coatings. With this comprehensive, tailor-made coverage, it may be said that the bewildering problem-child, plastics statistics, has finally graduated to long pants.

The "Facts for Industry" series has absorbed the reports formerly included in the Bureau's "Current Statistics Service." Among these are monthly, quarterly and annual reports on production, consumption, shipments, and stocks of many individual manufacturing industries, including paint, lacquer, superphosphate, asphalt roofing, pyroxylin-coated fabrics, porcelain enameled products, cottonseed products, and fats and oils. These old reports, some of which go back for over 20 years, were the ones with which the Census Bureau first emphasized the value of statistics which present the motion picture of continually changing volumes, with their great advantage over the usual historical record which is like an album of still pictures.

NEXT MONTH

The Bureau of Mines will be the subject of the 4th article of this series, to appear next month. When the series is completed it will be reprinted in booklet form for general sale.

Deserving of cum laude mention is the "Animal and Vegetable Fats & Oils" report series which has for over 25 years recorded the quarterly production, consumption, stocks, imports and exports of 60 fats and oils and such related products as shortening, stearic acid and red oil, foots, and refined glycerin. The high degree of intercommodity competition in this field is sharply revealed in the consumption-by-uses figures in this report. In its pages have been recorded the intense competition between lard and hydrogenated oils, the huge volume of cottonseed oil made into food products, and the sensational rise of soybean oil to the billion-pound class during the last decade. Articles based on this report and on related information are periodically published in the Department of Agriculture's monthly "Fats & Oils Situation" and the Bureau of Foreign & Domestic Commerce monthly Industry Report "Fats and Oils."

Another veteran is the "Paint, Varnish and Lacquer" series which has continuously covered some 500 to 700 manufacturers for many years, and shows breakdowns into industrial and trade sales. Other old-timers are the report series on "Superphosphate," "Gelatin" and "Pyroxylin Coated Fabrics" (Leather Cloth). Current figures of the 'Facts for Industry" and predecessor series concerning chemicals and allied products have been regularly reprinted in the Chemical Economics & Statistics section of CHEMICAL INDUSTRIES.

The Census Bureau has called attention to the fact that a great part of the monthly figures collected during the war were for the administrative operations of the War Production Board, and that relaxation of wartime controls has led to dropping many "Facts for Industry" series. Others, with obvious postwar value are being continued by the Census Bureau on a simplified basis. For example, the report on inorganic chemicals (Series 6-1) has been reduced to about half its former content. New titles, however, will be added as industry surveys are initiated in a number of consumer durable goods lines and other industrial areas in which production was virtually suspended during the war.

Industry and product group titles are

listed in the "Facts for Industry" Index of Publications, issued in October 1945. Separate products are exhaustively indexed in Census Publications "3. Subject Guide," July-September, 1945.

IMPORT AND EXPORT STATISTICS

The responsibility for foreign trade statistics was transferred to the Census Bureau from the Bureau of Foreign & Domestic Commerce in May 1941. J. Edward Ely is chief of the Foreign Trade Division of the Census Bureau. Although war regulations halted the publication of virtually all foreign trade statistics later than those for September 1941, the Census Bureau continued to compile statistics, in even greater detail than formerly, for guidance of the various government agencies concerned with military and industrial decisions.

From Pearl Harbor to V-E Day, the only current foreign trade statistics released were grand total values and shipping weights, without information on countries or commodities. Selected figures covering only certain sections of U. S. foreign trade were released from time to time, on a substantially delayed basis. Following V-E Day, the Census Bureau began to release a great variety of import and export statistics, but continued to withhold data on strategic, critical and military commodities and trade with countries in the Pacific theater of military operations.

The end of the war has brought about the lifting of all security regulations except that the statistics do no include information on imports or exports of uranium or thorium. All data on imports and exports are now being made available to the public and reports covering periods for which censored reports were previously issued are now providing complete information.

Foreign trade reports are primarily concerned with the quantities and values of commodities, as individual items and totals. The detailed figures are usually in commodity-by-country arrangement, but other regular or special presentations are commodity-by-customs district, country-by-commodity or customs district-by-commodity arrangements. For imports, there are data on tariff paragraphs and rates of duty. A wartime development which the Census Bureau will continue is that of supply shipping weights of individual commodities, in addition to the usual net quantities, which are expressed as tons, yards, gallons, etc.

The Bureau has abandoned certain prewar reports on warehouse entries and withdrawals, drawbacks paid, and Customs Districts through which imports and exports are made, but these reports will be resumed if demand warrants.

OLD FOREIGN TRADE SERIES

For many years, import and export statistics have been published in the detailed annual report "Foreign Commerce and Navigation of the United States" and in the "Monthly Summary of Foreign Commerce of the United States." These were supplemented by a series of 182 monthly and annual mimeographed statements, showing in detail the trade in many commodity groups, with breakdowns by countries and other specialized tabulations.

The annual report was last published in complete form for 1942, but the 1943 and 1944 issues will be available in 1946. The report covers thousands of commodities, presenting detail figures on quantities, values, tariff paragraphs and rates of duty, countries and U. S. Customs districts. The "Monthly Summary of Foreign Commerce of the United States" records current imports and exports of individual commodities. "To date" figures are included in each issue, with 12-months figures in the December issue.

Trade between continental United States and its noncontiguous territories is recorded only in the "Monthly Summary," with summaries each month and more detailed data on commodities in the December issue (e. g., yearly totals for shipments of citric acid from Hawaii to the continental U. S.).

NEW FOREIGN TRADE SERIES

The writer learned to regard "Foreign Com & Nav" as the gospel during his years with the Tariff Commission and is delighted to know that plans are going forward to publish again this great series of reports and the "Monthly Summary" on a current basis. The Census Bureau discontinued the 182 mimeographed statements after 1941. All of these have been superseded by the more comprehensive new group of Foreign Trade Reports. With war secrecy gone and the advent of the "now it can be told" era, the Census Bureau has indeed swung into reconversion on a magnificent scale, with a program of broad scope and prompt publication. Each of the numerous new series comprises 12 monthly issues and an annual number (and is designated as Report No. FT followed by a number). Some of the earlier reports cover a period of six months.

There are five series of "Advance Summary Statistics" on imports and exports containing textual and statistical highlighs on foreign trade:

FT-930 Individual commodities.

FT-950 Individual countries.

FT-960 Exports under the UNRRA program.

FT-970 U. S. Customs Districts and ports.

FT-975 Entrance and clearance of vessels in the foreign trade of the United States.

Import Statistics are published in three major series:

FT-100 Commodity totals.

Ft-110 Commodity-by-country data. This covers 5,500 commodities and may be optionally ordered in three sections.

(*Turn to page 312*)

An elaborate new group of monthly publications, well indexed, now supplements the annual series, "Foreign Commerce & Navigation of the U. S." Mildred Lowry, of Atlas Powder Co.'s Development Department, here prepares a tabulation.

INFRA-RED SPECTROSCOPY

Saves Time in Industrial Analysis and Research

by NORMAN D. COGGESHALL, Physicist
Gulf Research & Development Company
Pittsburgh, Pa.

ENOUGH HAS BEEN LEARNED ABOUT infra-red spectroscopy to permit its use in routine industrial analysis, as well as in research. Analyses, which by chemical methods require hours, can now be carried out in a few minutes by this technique. The initial cost—five thousand dollars, including all necessary accessories—is not prohibitive for the average equipment budget.

IN THE PAST few years there has been considerable excitement and publicity over the applications of infra-red spectroscopy to chemical problems. This has taken the form of a large number of articles, discussions, and technical publications[1] as well as advertisements issued by the instrument makers.[2] The principal applications which the chemical industry is making of this tool are analyses of chemical mixtures by techniques which are both speedier and more accurate than prior chemical means, and the solutions of research or control problems on such subjects as molecular structure, particle size, polymerization, etc.

For many years the fundamental aspects of infra-red spectroscopy have been delved into by physicists.[3] During these studies the subject became sufficiently developed and the basic facts clearly enough understood so that widespread application naturally followed as soon as more rugged equipment was built. Now, by following directions from a manual or sheet of instructions carefully, it is possible for personnel without advanced academic training to use the equipment and techniques with a considerable saving of time and expense.

HOW IT WORKS

The region of the spectrum in which we are interested here, called the infra-red, lies between 1μ and 20μ ($1\mu = 10^{-4}$cm). These radiations have much longer wavelengths than the eye, photographic plates, or photoelectric cells can detect. The manner of applying it is to utilize the differences in absorbing powers for different substances in this region. Since the optical instruments used (about which there will be some discussion below) can separate light of all wavelengths into beams of uniform wavelengths, it is possible to examine a substance at these individual wavelengths and in this way to "map" its absorption spectrum. For example, with the instrument set to allow measurements at a particular wavelength, we may determine the intensity of light falling upon a substance and the intensity of light which passes through it, thus allowing us to calculate the percent transmission. If we do this for successive wavelengths and plot the results, we obtain absorption spectra, such as those shown in Fig. 1.

In Fig. 2 is seen a schematic diagram of an infra-red spectrometer by means of which the data can be obtained. In this figure, A represents a source of infra-red radiation which may be a rod of carborundum through which electrical current is passing, causing it to operate at near white heat. Light from A is caught by the mirrors B′ and B and focused on the slit D. Before reaching D, however, it passes through the sample cell C. After passing through the slit D the light goes on until it is reflected by the mirror E. This mirror gathers the light into a parallel beam and as such it falls upon the optical prism F. The prism is made of some material such as lithium fluoride, sodium chloride, or potassium bromide. Upon passing through the prism the different wavelengths are bent differently with the result that they emerge from the second face of the prism at slightly different angles. The light is now reflected by the mirror G so that it again passes through the prism with additional angular separation of the wavelengths. Some of the light, after passing through F for the second time, is caught by E and reflected onto the mirror H which allows it to pass through the slit I onto the mirror J, which reflects it onto the final mirror K. From K the light goes to L, a vacuum thermocouple, from which electrical signals are obtained. With this arrangement of optical parts, the light passing through the slit I is practically all of the same wavelength. The wavelength of the light passing through I may be controlled by changing the angle of the mirror G. This is done by a mechanical arrangement so that readings may be taken manually, or the mirror may be rotated mechanically with automatic recording of the spectra. Specially built to be responsive to minute amounts of radiant energy, the thermocouples are operated in a vacuum to increase their sensitivity. In operation the sample cell C may be moved out of the light path to allow a determination of the light intensity of a certain wavelength which is incident upon the cell. When it is moved in place, the intensity of light of the same wavelength which is transmitted by the sample is determined. The windows as well as the prism must be of the materials mentioned above since glass or quartz will not transmit light of the wavelength used. In Fig. 3 may be seen a commercially made instrument, while Fig. 4 illustrates three different types of absorption cells in use. The one on the left is for gases, the center one is for materials in solution with a relatively transparent solvent such as CCl_4, and the right hand one is for pure liquids. The instrument shown in Fig. 4 has gas cells in place in an adjustable carriage.

WHY IT WORKS

The manner in which a compound ab-

The author is indebted to Miss E. L. Saier for obtaining and tabulating some of the data used and to Dr. Paul D. Foote, executive vice-president of Gulf Research & Development Company, for permission to publish this material.

sorbs light in the infra-red region depends directly and intimately upon its molecular structure. The light energy absorbed excites vibrations between and among the atoms constituting the molecule. As a result the mechanical structure of the molecule, i.e. the geometrical disposition of the atoms and the forces between them, determines which wavelengths are strongly absorbed and which are not. Two basic facts emerge from this: different compounds with some similarities in structure will, in general, exhibit some similarities in their absorption spectra; and different types of molecules will have differences in molecular structure which are responsible for variations in the absorption spectra. As an example of the first fact, it is true that all compounds containing the C-H valence bond will have an absorption band near 3.4μ, while all molecules containing an O-H group will have a band near 2.75μ. Other types of bonds which will cause absorption at approximately the same wavelengths irrespective of the remainder of the molecule are N-H, Cl-H, C=O, C=C, etc.

If we look at Fig. 1, certain similarities and differences in the absorption spectra will be evident. For example, each compound shows heavy absorption at about 3.5μ. This absorption, as well as the doublet absorption at about 7μ, is due to the C-H valence groups in the molecules. This illustrates how compounds containing the same valence groups always have absorption bands at about the same wavelength. This phenomenon is of very great usefulness in research work, where problems of molecular structure are encountered. Valence groups which can readily be determined from the absorption spectra are O-H, C-H, N-H, C=O, C=C, and C=C as well as several others. In a particular problem an organic chemist may prepare a compound for which he knows the empirical formula, i. e. the relative numbers of the different elements present. However, he may not know the geometrical disposition of the atoms in the molecule, i. e. the structural formula. If the molecule contains an oxygen atom the compound may be an ether, an alcohol, or a ketone. If it is an alcohol an O-H absorption band will appear; if it is a ketone a C=O absorption band will appear; if it is an isomeric mixture of the keto and enol form both bands will be present; and if it is an ether neither of them will be evident. Thus, with such information as this and knowledge of its chemical nature supplied by the one preparing the compound, it is often possible to determine completely the molecular structure. Identification work of this sort is actually being done on an almost routine basis in many industrial laboratories today.

Returning again to Fig. 1 we see that there are a number of large and distinct differences between the spectra shown. These differences form the basis for the use of infra-red absorption for quantitative analyses. The infra-red absorption at any particular wavelength for a mixture of compounds is the resultant of the absorption due to each individual one present. Thus, if the absorbing properties of the different compounds in the pure state are known, the data obtained for a mixture can be used in calculations which will yield the individual concentrations. This process is really more complicated than has been indicated here and it is beyond the scope of this article to outline the details. It has been de-

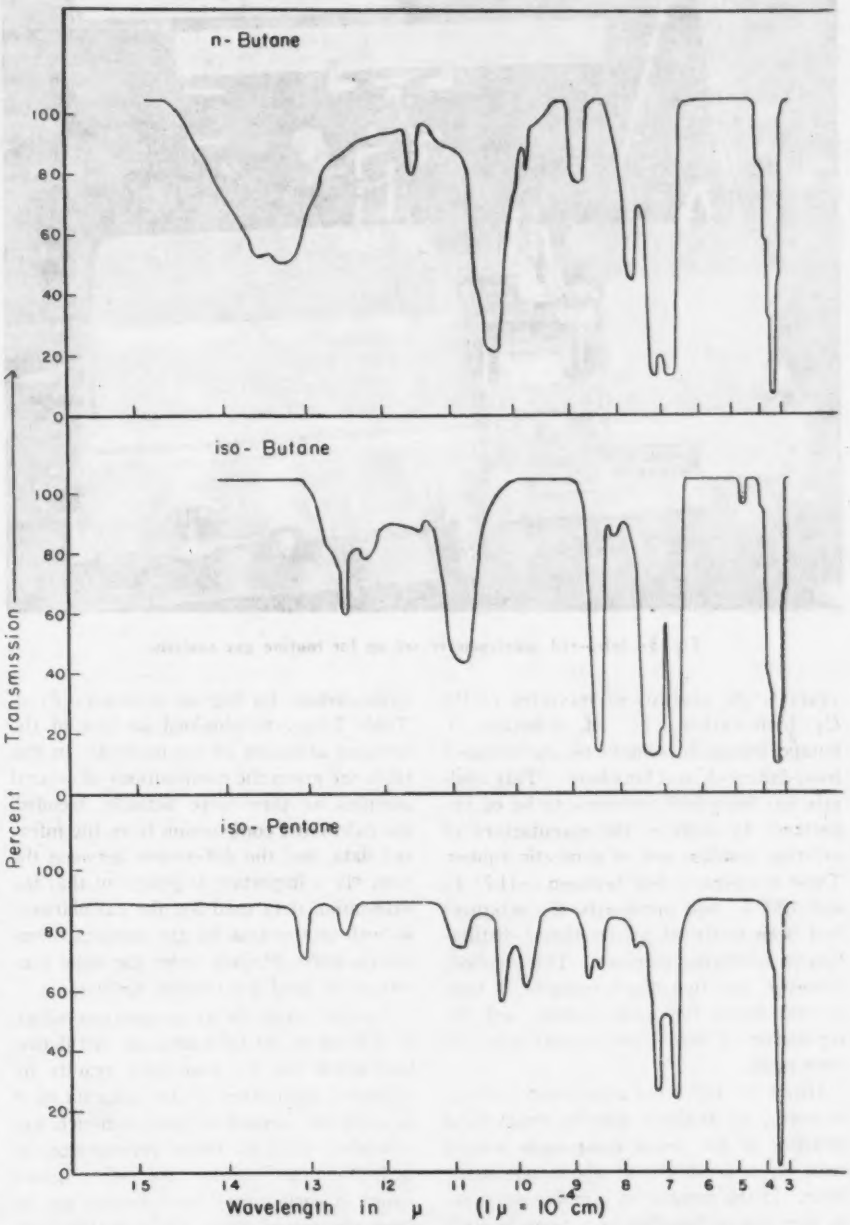
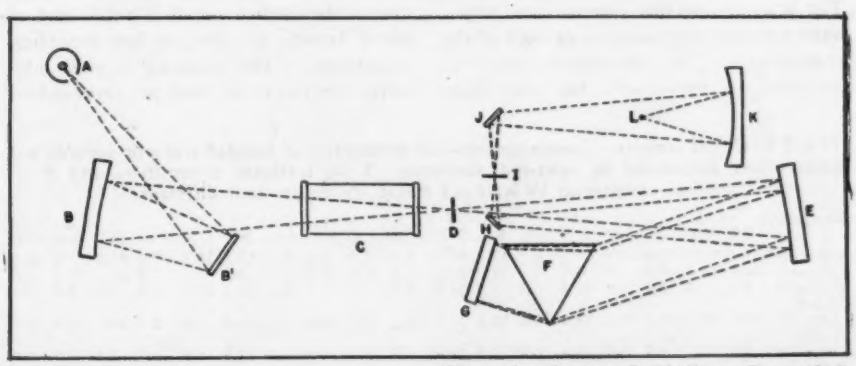


Fig. 1—Infra-red absorption spectra of n-butane, isobutane, and isopentane.



(Illustration Courtesy Perkin-Elmer Corporation)

Fig. 2—Optical diagram of versatile infra-red spectrometer.

scribed in the literature,[4] however, and is in very wide use today.

USE IN ANALYSIS

An application of the quantitative method which has been of great value to the petroleum industry in the past few years is the analysis of mixtures of the C_4 hydrocarbon, i.e. of *n*-butane, *i*-butane, butene-1, isobutylene, *cis*-butene-2, *trans*-butene-2, and butadiene. This analysis has been and continues to be of importance to steps in the manufacture of aviation gasoline and of synthetic rubber. These compounds boil between —11.7° C. and 1.5° C. and previously the mixtures had been analyzed by fractional distillation in rectifying columns. This method, however, has two disadvantages: it took several hours for each sample, and the separation of the olefin isomers was not very good.

Using the infra-red absorption method, however, an analysis may be made on a mixture of the seven compounds named with an expenditure of about one man-hour. If the number of samples warrants it, they can be handled by a team in such a manner that one is processed by the spectrometer every forty minutes or less. For analyses of this type certain requisites must be met: samples of each of the compounds to be determined must be available in pure form for calibration of the instrument, and the mixture must be pretty nearly free of compounds not among the system for which the calibration is made. As an example of the latter, a mixture of the C_4 hydrocarbons named should not contain more than a few per cent of lighter or heavier hydrocarbons for highest accuracy. From Table I may be obtained an idea of the inherent accuracy of the method. In this table are given the compositions of several samples as they were actually blended, the calculated composition from the infra-red data, and the differences between the two. It is important to point out that the calibration data used for the calculations, as well as the data for the samples themselves, were obtained under the same conditions as used for routine analyses.

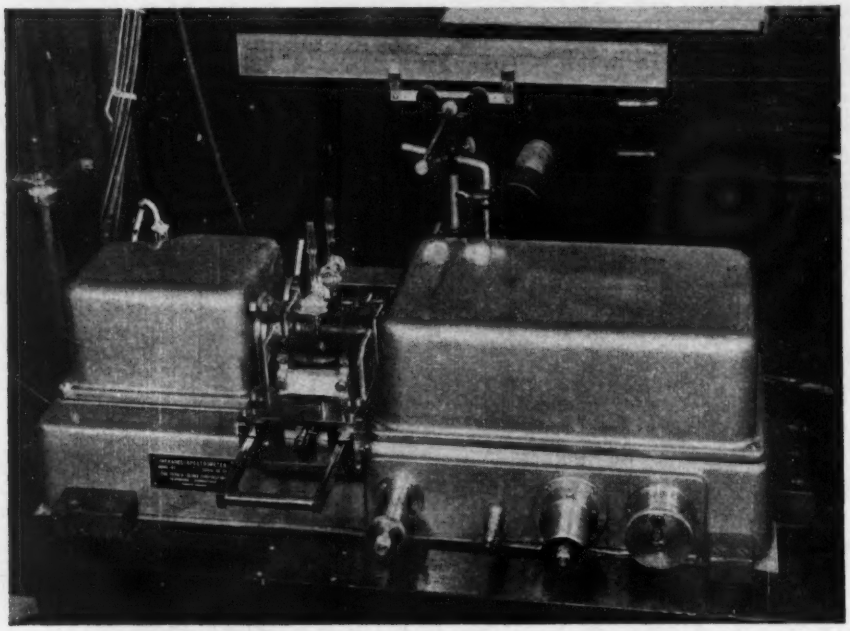


Fig. 3—Infra-red spectrometer set up for routine gas analysis.

Another example of an analysis which is difficult to do by fractional distillation but which can be done very readily by infra-red absorption is the determination of methane content in hydrogen-rich gas mixtures such as those encountered in hydroforming.[5] Since the other gases found in such samples are known not to have absorption bands that overlap with that of methane, a direct analysis for the latter alone can be made. This analysis can be carried out in a total time of about twenty minutes or less including calculations. The accuracy is quite adequate for the needs, and an appraisal of it can be obtained from Table II which gives a comparison between the compositions of the samples as blended and as found by infra-red.

A further application along the same line is the analysis of flue gases from a catalytic cracking unit. Periodic analyses of such flue gases for CO, CO_2, and SO_2 may be used for control purposes as well as for giving important information concerning the operation. Such analyses may be carried out in about twenty-five minutes total time, including calculations.[5] Table III, which compares the results obtained for a series of synthetic blends with the compositions as blended, illustrates the accuracy obtainable using an ordinary monochromator and auxiliary apparatus.

In the analysis of mixtures of liquids all of which have nearly the same boiling points, fractional distillation is at a disadvantage if the concentrations of the individual compounds are desired. But since the individual compounds have differences in molecular structure, they will manifest differences in their infra-red absorption spectra which make the analyses by this method feasible. Even if the mixtures are of isomers which differ only in details of atomic groupings, their spectra will be distinctly different. Fig. 1 illustrates this, where it is obvious that *n*-butane and *i*-butane have quite different spectra. If the mixture is known or is found to contain a large number of separate compounds, it will in most cases be practical to fractionally distill it into cuts each containing a smaller number. These cuts may then be examined by infra-red to obtain the individual concentrations in each and the results for all

TABLE I. C_4 gas samples. Comparison between composition of blended synthetic samples and compositions determined by infra-red absorption (S = synthetic compositions and F = observed composition by infra-red means, Δ = per cent difference).

Sample No.	1			2			3			4			5			6		
	S%	F%	Δ%	S%	F%	Δ%	S%	F%	Δ%	S%	F%	Δ%	S%	F%	Δ%	S%	F%	Δ%
n-Butane	55.4	54.8	0.6	0.0	0.2	0.2	17.8	17.9	0.1	0.0	0.0	0.0	19.7	18.8	0.9	32.2	32.1	0.1
i-Butane	44.6	44.3	0.3	0.0	0.1	0.1	33.2	33.8	0.6	0.0	0.6	0.6	10.4	10.6	0.2	30.3	30.9	0.6
Butene-1	0.0	0.0	0.0	18.5	18.4	0.1	13.2	14.0	0.8	61.8	61.5	0.3	19.8	20.6	0.8	0.0	0.2	0.2
Isobutylene	0.0	0.3	0.3	14.0	14.4	0.4	11.6	11.1	0.5	0.0	0.0	0.0	16.8	16.9	0.1	20.1	19.8	0.3
cis-Butene-2	0.0	0.5	0.5	39.2	38.4	0.8	13.2	12.9	0.3	18.7	18.9	0.2	14.8	14.8	0.0	0.0	0.0	0.0
trans-Butene-2	0.0	0.1	0.1	28.3	28.5	0.2	11.0	10.3	0.7	19.5	19.0	0.5	18.5	18.3	0.2	17.4	17.0	0.4
Butadiene	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	..	..	..	0.0	0.0	0.0

TABLE II. Analysis for methane. Comparison between concentration of methane in synthetic samples and concentration as determined by infra-red absorption.

Sample No.	*% methane Synthetic*	*% methane Calculated by I-R*	*% Difference*
1	14.5	14.7	0.2
2	7.6	7.7	0.1
3	6.0	6.1	0.1
4	22.5	22.3	0.2
5	4.9	4.9	0.0
6	3.7	3.8	0.1
7	1.3	1.4	0.1
8	0.8	0.8	0.0

TABLE III. Comparison between blended synthetic samples and concentrations measured by infra-red absorption for flue gas analyses.

Sample No.	*Compound*	*Synthetic*	*Observed*	*% Dev.*
	CO_2	10.5	10.4	0.1
1	SO_2	2.1	2.3	0.2
	CO	4.2	3.9	0.3
	CO_2	6.7	6.9	0.2
2	SO_2	1.4	1.4	0.0
	CO	9.4	9.5	0.1
	CO_2	6.2	6.2	0.0
3	SO_2	1.9	1.9	0.0
	CO	4.0	4.1	0.1
	CO_2	4.0	4.2	0.2
4	SO_2	1.3	1.3	0.0
	CO	2.6	2.5	0.1
	CO_2	2.7	2.8	0.1
5	SO_2	1.0	1.0	0.0
	CO	5.2	4.8	0.4
	CO_2	1.7	1.9	0.2
6	SO_2	0.6	0.6	0.0
	CO	3.4	3.1	0.3
	CO_2	7.0	7.1	0.1
7	SO_2	1.9	1.9	0.0
	CO	6.1	6.3	0.2
	CO_2	4.4	4.6	0.2
8	SO_2	1.2	1.2	0.0
	CO	4.0	3.9	0.1

cuts combined for the complete sample. The reason for the distillation into cuts is that it becomes rather difficult to obtain good quantitative results when too many compounds are present. It may be said that if the mixture contains of the order of 12 or more different compounds, such a procedure would be advisable. Table IV shows an analysis of a cut from the products formed by pyrolysis of a saturated naphtha and is representative of the type discussed above.

Along the line of isomer mixtures, Wright[6] has described a method whereby he could determine the amount of 1,2-dibromopropane in 1,3-dibromopropane with an error of determination of about ±0.05 per cent (total sample). This analysis can be done in five minutes, can detect a concentration as low as 0.3 per cent, and requires a sample of only about 0.1 cc. Recently Whiffen, Torkington and Thompson[7] have published results on analyses of cresylic acid isomers. One of their tables illustrating the accuracy is reproduced as Table V and, as can be seen from it, the errors are small.

The analyses discussed above represents only a few of many that can and are being done today on a routine basis. As new analytical problems arise they are being solved by the various groups of investigators using this technique in the research organizations of many industrial concerns.

TABLE IV. Infra-Red Analysis of a distillation fraction from the products formed by pyrolysis of a saturated naphtha.

Compound	*Concentration*	*Boiling Point*
Methylheptanes	5%	117.4-119.2°C
3-Methyl-3-ethyl pentane	7%	118.4°C
3-Ethylhexane	11%	118.6°C
trans-1,4-Dimethylcyclohexane	4%	119.6°C
trans-1,2-Dimethylcyclohexane	6%	123.7°C
n-Octane	22%	125.4°C
cis-1,2-Dimethylcyclohexane	15%	130.1°C
Ethylcyclohexane	9%	130.4°C
1,1,3-Trimethylcyclohexane	14%	138.5°C
3,3-Diethylpentane	7%	139.2°C

TABLE V. Analyses for the isomers of cresylic acid showing comparison between synthetic composition and concentration found by infra-red (from Whiffen et. al. reference 7).

	g. per c.c.				*Percentage.*		
Mixture 1	*ortho*	*meta*	*para.*	*total*	*ortho*	*meta*	*para*
Taken	0.31	1.61	1.41	3.33	9.3	48.4	43.3
Found	0.30	1.60	1.45	3.35	8.9	47.8	43.3
Mixture 2							
Taken	0.60	1.61	1.27	3.48	17.2	46.2	36.6
Found	0.60	1.65	1.30	3.55	16.9	46.4	36.7

USE IN RESEARCH

As was mentioned earlier, certain atomic groups, such as O-H, C-H, N-H, C=O, C=C, etc., can be definitely proved to exist in a compound by virtue of their unique absorption properties in the infra-red. This is of great value in the research applications of the technique as it gives an additional powerful tool for the determination of molecular structure. Frequently knowledge gained by this approach coupled with chemical information concerning the preparation of a compound results in a complete description of the structure. Many other research applications of both academic and industrial interest are possible and the scope of the subject is being constantly enlarged. To mention a few of these applications, we may refer to the study of hydrogen bonding, molecular association, formation of azeotropes, the vulcanization of rubber, studies of compounds of large molecular weight, studies in interatomic bond strengths, thermodynamical data, and pigment particle size.

WHAT IT COSTS

With the quality and versatility built into today's commercial infra-red spectrophotometers, it is possible very satisfactorily to use the same instrument for both routine analysis and research work. When such an instrument is purchased it is sometimes of advantage to formulate a policy concerning its use. Even though it may be intended that the instrument serve both purposes, the situation may develop, through greater priority being assigned some projects, that it is being monopolized for but one function. This may be the more expedient procedure at the time, but it may prove to be detrimental in realizing the fullest advantages of the equipment in the long run. The obvious solution—buying an additional instrument—may be impossible in the case of a small company with a limited budget for research.

In setting up a program for infra-red work, for either routine analysis or control, about $5,000 should be allowed for initial equipment cost. A good instrument may be purchased for a price near $3,000. Auxiliary equipment in the form of vacuum systems, electrical apparatus, etc., will use up the remainder. But this allows the instrument only to be operated manually. If the program includes many research activities or work on liquids, automatic recording equipment is worth the additional cost which may range up to $2,000. Usually extra, time-saving equipment is worth the cost, as the operators must be fairly skilled.

The basic components of this equipment do not wear out with use and do not need to be replaced periodically. When obsolescence does accrue it will be due to newer methods and apparatus which allow the same jobs to be done better and in less time. Also, the user of such equipment in the ordinary industrial laboratory need not have too much concern as to patents. Much of the equipment used is unpatentable, having been developed in academic institutions.

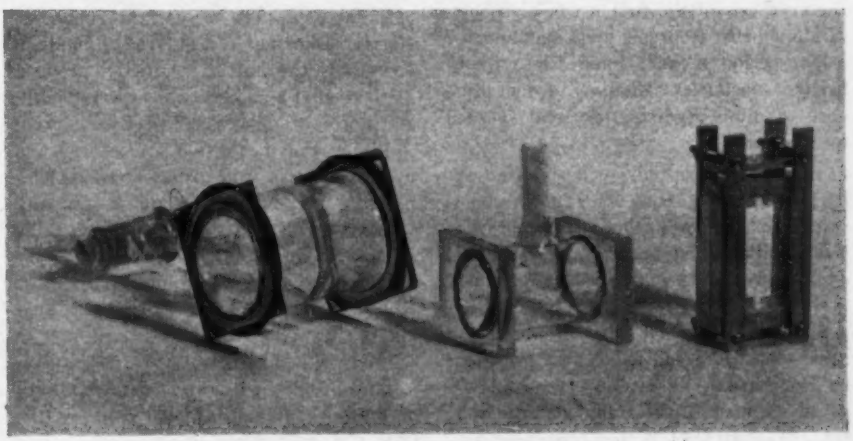


Fig. 4—Different types of absorption cells used for infra-red spectroscopy.

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[3] See for example: W. W. Coblentz, "Investigations of Infra-Red Spectra," Carnegie Institution of Washington (1905).

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OLEFINS USED

Over 275,000 tons of ethylene and 220,000 tons of propylene will be used this year for the production of synthetic organic chemicals, according to A. W. Pratt and N. . Foskett of Stone and Webster Engineering Corporation. One of the recent outstanding developments in the chemical industry has been the production of synthetic organic chemicals from these substances. Their availability and low cost have fostered the large scale production of a wide variety of synthetic organic chemicals such as glycols, alcohols, plastics, and solvents.

The First Century of Synthetic Rubber

by HOWARD H. IRVIN, E. Chicago, Ill.

HERE the history of synthetic rubber is explored, from the recognition of the formula for natural rubber by Faraday in 1826 to the present large scale manufacture and use of GR-S and other elastomeric substances.

DEVELOPMENT of a synthetic elastomer to replace natural rubber extends over a period of more than one hundred years. The most striking advances, however, were crowded into the last decade.

In talking of "synthetic" rubber, it must be realized that the term is a misnomer, since none of the synthetic elastomers are chemically the same as natural rubber. So-called "synthetic rubber" is an elastic, rubberlike material which resembles natural rubber in many of its physical properties, but which differs in chemical structure.

EARLY DEVELOPMENTS

An oil obtained by destructive distillation of natural rubber was described by Rozier (47) in 1781. In 1826 Faraday reported the results of his investigations (19). He recognized that natural rubber was a hydrocarbon of the formula $(C_5H_8)_n$ and his quantitative determination of carbon and hydrogen was quite accurate, considering his facilities.

During the 1830's more work on natural rubber was carried on by Himly, Liebig, Dalton, Gregory and Bouchardat, but, it was not until 1860 that G. Williams isolated isoprene, C-H_8. (17,22,44,47).

Bouchardat (52) may be credited with the synthesis of the first artificial rubber. He found that isoprene, upon standing for a long period of time, changed into a rubberlike substance. Heating in the presence of dilute hydrochloric acid speeded up this reaction.

This was the initial synthesis of a rubberlike material, however, the raw material could be only obtained by destructive distillation of natural rubber. This situation remained until 1884 when Tilden prepared isoprene by the pyrolysis of turpentine (21,44). He also produced the same rubberlike substance first prepared, by Bouchardat. This elastomer could be cured with sulfur, just like natural rubber (21). In 1894 Weber confirmed Tilden's observations (67).

Kondakoff in 1901 polymerized 2,3 dimethyl butadiene while Thiele used 1-methyl butadiene (21). The soaring rubber prices during the period 1908-1910 intensified this work but no striking results were attained.

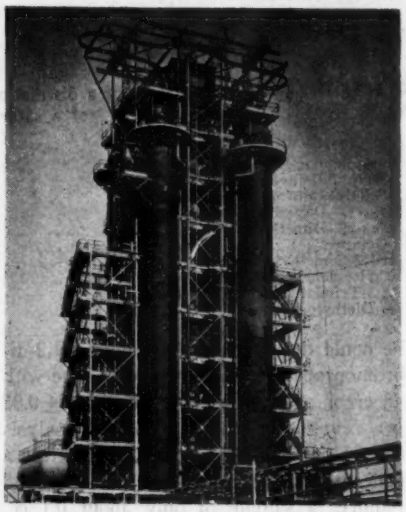
In 1909 Hofmann and Harries in Germany (3) produced an elastomer by heating isoprene for several months. Lebedev in 1910 was apparently the first to report on the polymerization of 1,3 butadiene, which had been synthesized as early as 1863 by Caventon (25). In 1910 the polymerization of dienes by the catalytic action of sodium was discovered independently by Mathews and Strange in England and Harries in Germany (17,22,44). This discovery for the first time showed promise for the commercial production of "synthetic" rubber, and in 1912 Germany exhibited a tire in New York made from a sodium polymerized elastomer.

Mathews and co-workers also worked out commercial methods for the production of isoprene from amyl alcohols and of butadiene via catalytic dehydrogenation of butylene glycols (44).

By 1912 artificial rubbers had been made from isoprene, piperylene, 1,3-butadiene, 2,3 dimethyl 1,3 butadiene, 1,1-4,4 tetramethyl 1,3 butadiene, 1,1 dimethyl 1,3 butadiene.

No serious attempts at commercial production were made, however, until the desperate shortage of natural rubber in Germany during World War I made it necessary to find a synthetic product. 2,3 Dimethyl butadiene was selected as the starting material because of ease of preparation. Polymerization was carried out by storing it in iron drums at room temperature for 2-3 months, or in pressure vessels at 70° C, or by use of metallic sodium in an atmosphere of carbon dioxide. About 2350 tons of this "Methyl Rubber" were made at Leverkusen during the war years.

"Methyl Rubber" had very poor physical properties, with the tensile strength of the pure gum below 400 psi. At the time the reinforcing qualities of carbon black were not known to the Germans.



Distillation towers at the Monsanto styrene plant, Texas City, Texas.

Whitby and Katz later obtained a tensile strength for methyl rubber of about 2400 psi by addition of carbon black (68). In spite of the lack of physical strength in their elastomer, the Germans carried on much work on anti-oxidants to keep their product from deteriorating. It was soon found that some of these antioxidants also accelerated rubber curing, laying the foundation for use of antioxidants and accelerators in rubber compounding. However, the first publications disclosed that antioxidants had been used in the United States for some time in secret.

After the war, with natural rubber at 11.75 cents per pound, "Methyl Rubber," unable to compete either in physical properties or in price, completely disappeared. By 1925 the Stevenson Plan had raised the price of natural rubber to $1.21 per pound, again initiating work on an artificial substitute.

In Russia from 1915-1917 the work of Ostromislensky (3) and later Lebedev led to processes of butadiene manufacture which are still used on a large scale. Since that time the Russians have concentrated on the sodium polymerization of butadiene.

RECENT DEVELOPMENTS

Early work on "synthetic" rubber was concentrating on producing a product chemically identical with natural rubber. When the work was taken up again around 1925, efforts were shifted more and more to the synthesis of a material

reproducing the physical properties of natural rubber.

In this country work on polysulfide-olefin polymers (Thiokol and poly 2-chloro 1,3 butadiene, neoprene) began in the 1920's. In Germany, work was shifted from sodium polymerization to the production of copolymers, employing a new technique, emulsion polymerization. As early as 1912 a German patent had been granted in which proteins were used as protective colloids for the polymerization of isoprene (10,8,9), but long periods of polymerization at elevated temperatures caused the denaturation of the proteins and premature coagulation of the polyisoprene.

The first emulsion polymerization patent was granted in 1927 (14,15). Here isoprene was emulsified in water at 50% concentration with agitation, using oleic acid and ammonia as the emulsifying agent in situ. The emulsion was then stored for six months at 50° C and coagulated with acetic acid. More British and German patents on emulsion polymerization were granted the same year. Three of these (26,28,60) also mention the use of oxygen-yielding substances, such as peroxides and perborates, to accelerate the polymerization. More patents followed in the early thirties (38,61,65) and the first references appear in the patent literature on copolymerization of butadiene and vinyl naphthalene (62,40) and butadiene and styrene (36,62,63). While vinyl naphthalene appears to have been copolymerized with butadiene first, styrene soon took the lead. At the same time butadiene and acrylonitrile were copolymerized to yield useful rubber substitutes.

After 1929 the price of natural rubber again dropped sharply and no commercial production of butadiene-styrene rubber was attempted. The advent of Hitler, however, changed the picture very quickly.

Thus in 1934 Germany began making the numbered "Bunas" (36,37,43) by the sodium polymerization of butadiene, from which their name was derived: Bu=Butadiene, Na=Sodium. Buna 85 and Buna 115 were in production by 1935, but were never produced in large quantities. By 1937 Buna S, the butadiene-styrene copolymer had reached commercial production and the first plant began operation with a rated capacity of 24,000 tons per year (22). In April, 1939 the large plant at Schkopau was opened. Here, for the first time manufacture of the raw materials and their polymerization were concentrated in one large plant (1).

OTHER COUNTRIES

Russia still concentrated on the sodium polymerization of butadiene, producing sizable quantities of synthetic rubber. Italy also had started production by the same methods (57). France showed little interest in synthetics. England, aside from some work on copolymerization of butadiene with methyl methacrylate (31), had hardly entered the experimental stage. Japan expanded her experimental program, while in this country neoprene and Thiokol had already appeared on the market for limited applications. In the meantime the world situation had become quite critical.

In February, 1940 Standard Oil Co. (N.J.) announced its acquisition of the Buna patents for the United States and in June Standard Oil's butyl rubber and Goodrich's Ameripol were announced. Later in the same year Firestone began production of Buna N, a butadiene-acrylonitrile copolymer similar to Ameripol, and of Buna S under license from Standard Oil (31).

GOVERNMENT PROGRAM

Shortly after creation of the Rubber Reserve Co. discussions were begun regarding the possible construction of synthetic rubber plants in this country. On May 9, 1941 the OPM recommended immediate construction of a plant for 40,000 tons per year. This was boosted to 400,000 tons in January, 1942 and to 805,000 tons later in the same year. Of this total 705,000 tons were to be GR-S.

By this time the situation had deteriorated to a point where our ability to fight the war was in danger. Our precarious position at that time may best be represented by one sentence in the Baruch report: "We find the existing situation to be so dangerous that unless corrective methods are taken immediately, this country will face both a military and civilian collapse." (50)

Decision as to the type of all purpose synthetic rubber to make rested between Buna N and GR-S. The choice fell on GR-S, chiefly because the raw materials were most readily available and convertible in plants demanding a minimum of critical construction materials.

All government synthetic rubber plants were built according to a standard design to speed construction. The polymerization process has been carried on without major modification since its inception (49).

TECHNICAL ASPECTS

As noted before, Germany had a large synthetic rubber plant, the Schkopau works (1), functioning. There butadiene was made from acetylene and formaldehyde through tetrahydrofuran by a five step process (5).

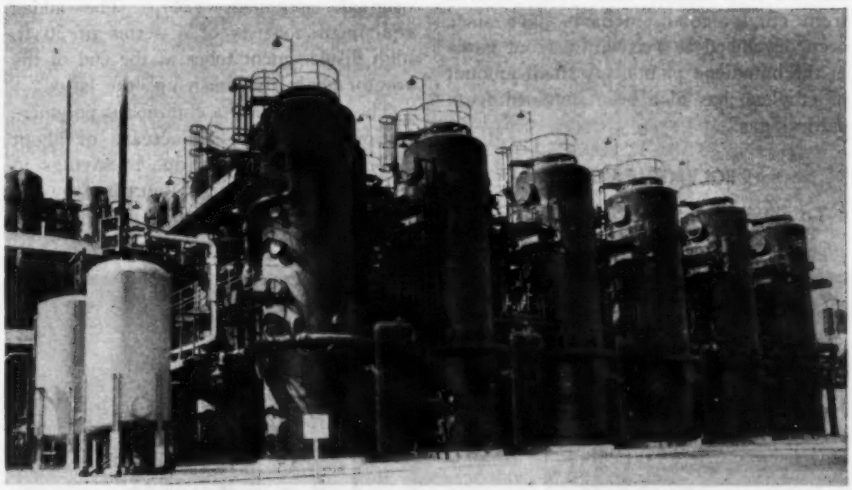
BUTADIENE

From Alcohol: Here ethyl alcohol is converted to acetaldehyde by catalytic oxidation and the acetaldehyde and when combined with more ethyl alcohol yields crude butadiene with the elimination of two molecules of water. This crude product is then purified by distillation and washing to a purity above 98.5% (55,56).

The first plants to be constructed for the production of butadiene were designed for this process, and by early 1945 had reached about 180% of rated capacity, with yields of about 2.4 lbs. of butadiene per gallon of 190 proof alcohol.

From Butylene: Projects for production of butadiene from butylene by catalytic dehydrogenation at high temperatures in the presence of superheated steam were started in January 1942, but in the early stages of the rubber program the emphasis was on the alcohol process because of the need of petroleum gases for aviation gasoline. Output from the butylene process reached 125% of rated capacity early in 1945 with a 60-70% yield.

In the long run the alcohol process will probably lose out, since butadiene can be made from butylene more cheaply. In fact, shortly after V-J day all alcohol butadiene plants were shut down. In a free market butadiene is expected to be available for about 4-6¢ per pound from the butylene process.



Units for production of butadiene from alcohol at a DPC plant operated by Carbide and Carbon

From Butane: A third process which has found limited application is the Houdry process in which butane is dehydrogenated in a two-stage process. Yields are said to be about 67% (4,64).

From Naphtha: A small amount of butadiene is made in California by steam cracking of naphtha and stove oil, a process which gives relatively low yields.

STYRENE

Styrene had been produced in this country on a commercial scale for some time prior to the huge expansion necessitated by the synthetic rubber program. In producing styrene, benzene and ethylene are catalytically combined to form ethylbenzene, which in turn is dehydrogenated to styrene at about 600°C. Aluminum chloride is used as the catalyst and hydrogen chloride acts as a promoter. The hydrogen chloride is introduced by adding ethyl chloride to the reaction mixture, which decomposes into ethylene and HCl.

The difference in boiling point between ethylbenzene and styrene is only 9°C, and about seventy plates are required to separate the mixture in a vacuum column. Polyethylbenzenes which are also obtained in this reaction are removed and dealkylated, but almost half are lost through cracking.

Oxides of aluminum, zinc and iron, and activated charcoal have been found very useful for the dehydrogenation step. Some toluene is obtained as a by-product and separated from styrene and unconverted ethylbenzene at reduced pressure. Styrene refining demands great care since styrene polymerizes very easily at elevated temperatures. To prevent polymerization, sulfur is added to the crude conversion product. All sulfur is removed from the purified styrene since its presence would interfere with the subsequent polymerization. It is replaced with a small quantity of para tertiary-butyl catechol to prevent polymerization during shipping and storage. Overall yields of this process (benzene to styrene) are given as about 86 percent.

While ethylene for styrene manufacture was at first almost exclusively derived from ethyl alcohol, methods have since been developed to recover it from gases in the butadiene plants. A small amount of ethylene has also been obtained from natural gas.

POLYMERIZATION

To obtain "synthetic" rubber, butadiene and styrene are emulsified in deionized water and then copolymerized in glass-lined pressure reactors equipped with an agitator. Three parts of butadiene and one part of styrene are emulsified in ten parts of deionized water with soap as the emulsifier. Buffers, a chain modifier (usually an organic sulfur compound), and a peroxide catalyst are added. The modifier is used to control branching and cross-linking of the polymer chains.

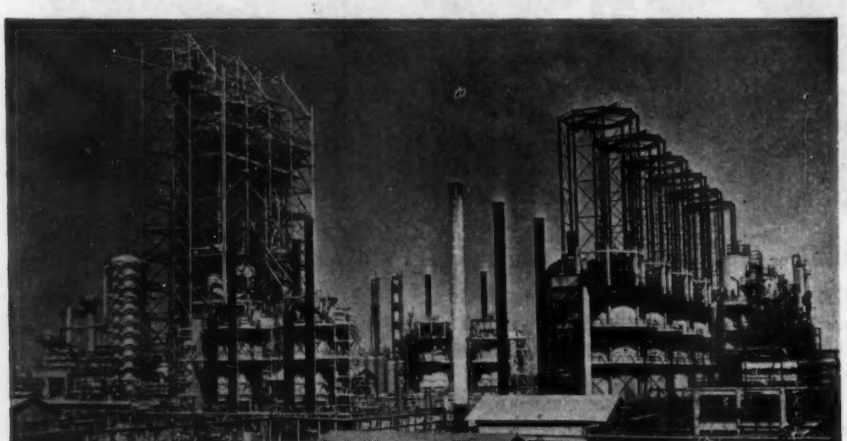
In most cases the reaction has been carried on as a batch operation. The reaction proceeds for about 14 hours at 122°F, leaving about 20-30 percent of unreacted butadiene and styrene. The latex formed is then discharged into a blowdown tank, carried through flash tanks to remove unreacted butadiene, and then through a stripping column to remove monomeric styrene, finally reaching the latex blender where latex from several reactors is blended.

The blended latex is pumped to the creaming tank where brine solution is added to cream the latex. The product then flows into the coagulating tank where sulfuric acid is added to cause coagulation and finally into a third tank where more acid is added to break down the soap into the free fatty acid (55).

The coagulated crumbs travel over a vacuum filter, a disintegrator, enter a vacuum drier, and finally emerge from an adjacent baler in 100 pound slabs, ready for packing and shipping.

The polymerization process was designed to be continuous except for the actual polymerization, altho for some time now, a continuous polymerization process has been in operation in one of the plants where the whole process has been made continuous without any change in the original equipment (24). The added equipment consists of a series of 30 ft. high displacement tubes at the end of the reactor chain to "finish up" the latex.

The advantage of a continuous polymerization process is an increase of about 50% in plant capacity due to savings in charging and discharge times and by the elimination of an inhibition period at the beginning of each reaction by maintenance of an oxygen-free system.



Butylene, from which butadiene for GR-S is produced, and high octane gasoline are products of the Thermofor catalytic cracking unit at the Richfield refinery near Los Angeles, Calif., which is seen on the right. The primary cracking furnaces are seen at the left.

GR-S VS. NATURAL RUBBER

A new polymer was not the solution to the rubber problem as GR-S is quite different from natural rubber in its properties. New compounding procedures had to be worked out and adjustments had to be made in curing cycles to give the most satisfactory product.

The chemical composition of GR-S and natural rubber is so different that a person not familiar with rubber chemistry might express serious doubts whether GR-S is a "rubber" at all. Natural rubber is built up of isoprene units linked together in orderly fashion in long chains. These hydrocarbon chains constitute a rubber of uniform composition. Upon stretching these chains align themselves into parallel strands, forming a crystal lattice identifiable through the patterns produced by X-ray scattering on a photographic plate.

In nature isoprene units may be linked either cis- (natural rubber) or trans- (balata or gutta percha) fashion. Natural rubber represents the cis configuration. The trans- structure is resinous physically different from natural rubber.

When isoprene is polymeried either with sodium or in emulsion a polymer is obtained which is partially cis, partially trans oriented. To date it has been impossible to form a pure cis polymer, which of course would be "synthetic rubber".

In making GR-S it has so far been impossible to obtain a polymer of perfectly controlled structure. Here there are not only cis and trans configurations in the same polymer chain, but butadiene molecules added to each other, and to styrene, in two different ways. Further, while the overall ratio of butadiene to styrene in standard GR-S is 3-1, this ratio is not maintained in the individual polymer chain, and at times that styrene molecules are joined together within a polymer chain. The polymer chains in GR-S also show a great tendency to branch and, under more severe conditions, or if the reaction is carried too far, crosslinking between chains is encountered. This leads to insolubility of the polymer.

GR-S does not crystallize on stretching as does natural rubber. Considering the irregular structure of GR-S this is not unexpected. The low tensile strength of pure gum GR-S can partially be explained by this lack of crystallization, which adds to the tensile strength of an elastomer due to the attractive forces between individual polymer chains.

GR-S COMPOUNDING

GR-S is more difficult to process than natural rubber. It has a very high retention of "nerve" and is difficult to break down, but it can be processed with regular rubber processing equipment.

Natural rubber breaks down very con-

siderably by a dozen passes, through a tight mill; GR-S handled in the same manner does not break down perceptively. GR-S requires the use of softeners to obtain a sheet of fair smoothness. Many have appeared, and some are fairly effective, especially at high concentrations and high milling temperatures (16,23,57).

Materials which are very effective with natural rubber, may have little softening affect on GR-S. In general, coal tar softeners, when used with GR-S, produce high modulus, good tensiles, good abrasion resistance, low heat generation and high energy rebound. Acidic materials, such as pine tar, ester gum and wood rosin, give low modulus, good tensiles, high elongation, poor abrasion resistance, high heat generation and low energy rebound (11).

GR-S shows very extensive shrinkage after milling, even with the use of plasticizers. The effect is even pronounced in highly loaded stocks.

Zinc oxide activates GR-S as it does natural rubber, and 3 to 5 parts per hundred of the polymer are customary.

Sulfur acts as a curing agent for GR-S, but a smaller amount is required than for natural rubber. This attributed to the lower degree of unsaturation of GR-S, although the belief is developing that the double bonds are not involved in the vulcanization of GR-S and that sulfur bridges are actually formed at the alpha carbon (38).

Sulfur does not disperse too readily in GR-S and master batches with 33-50% sulfur are found helpful in compounding.

GR-S requires more acceleration than natural rubber to cure at the same rate. Compounds containing channel black require more accelerator than those containing furnace or soft blacks (11). Since GR-S compounds do not scorch readily, relatively high acceleration can be used.

Generally speaking, the guanidines and aldehyde-amine accelerators alone are not very effective with GR-S, except in high concentrations. Thiazoles and their derivatives are useful, especially in conjunction with secondary accelerators of the first group.

Thiuram mono- and polysulfides are useful with GR-S, the monosulfides being the more outstanding. Dithio carbamates are exceedingly active in GR-S (45). Flat cures are generally obtained with the last three types, but curing temperatures show decided optima.

Since GR-S already contains an antioxidant it is usually unnecessary to add more during compounding.

REINFORCING GR-S STOCKS

Non carbon fillers: Pure gum GR-S has very poor tensile strength and tear resistance. In stocks where carbon blacks are undesirable, organic fillers will, under proper compounding, increase the tensile strength of a GR-S stock from a few hundred psi to about 2,000 psi. For wire and cable insulation, where good electrical properties are desired, and for non-marking sole stocks such resins as "Marbon S and S-1", coumarone-indene resins, and "Pliolite" have been used.

Here a workman at a plant of Standard Oil Co. (N. J.) inspects the slurry as it moves into a filter after it has been washed free from acid used to coagulate the latex.

Carbon Blacks: While addition of carbon black to natural rubber will not raise its tensile strength phenomenally, GR-S could never have been used successfully in tire building and other applications which demand high tensile strength, if it had not been for the reinforcing qualities of carbon blacks. While highest tensiles are obtained with easy processing channel blacks, combinations of medium processing channel and semi-reinforcing furnace blacks have been found acceptable (12).

GR-S gives maximum tensiles when loaded with about 25% more black than natural rubber, that is 50 parts of black to 100 of the polymer (18). Easy processing channel can give 3500 psi tensiles when used in GR-S. Carbon blacks are more difficult to disperse in GR-S than in natural rubber, and the finer the black, the more difficult the dispersion.

The blacks have been incorporated into the latex before coagulation showing a substantial saving in milling times (16,39).

PROPERTIES OF GR-S COMPOUNDS

By far the largest consumer of GR-S is the tire industry and, while GR-S still has many weaknesses, it has been successfully used in building all-synthetic tires (53,54,58,66). Lack of tack of GR-S has been a handicap in tire building and efforts to remedy this situation have not been too successful. The replacement of fatty acid soaps with rosin soap as the emulsifying agent during the polymerization is said to increase tack and at the same time to reduce heating due to internal friction (59) which greatly reduces tensile and tear strength as the temperature increases (57). Because of this truck tires must have some natural rubber added to stand up under the rigorous conditions of operation. Passenger tires made entirely with GR-S have proven satisfactory.

In extrusion the main difficulties associated with GR-S are its great nerve and tendency to tear at elevated temperatures. Compounds of low hardness are too thermoplastic in most cases for satisfactory extrusion. Extremely soft high strength stocks are almost impossible to formulate from GR-S (32).

While the low tear strength of GR-S at elevated temperatures is detrimental in most applications, in the molded goods field it is actually advantageous, since flash and rind can be removed without causing damage.

Resilience, low temperature properties and flexing obtainable with natural rubber formulations are difficult to duplicate with GR-S. GR-S has better abrasion resistance than natural rubber, and shows somewhat better oil and solvent resistance. Resistance to heat aging and oxidation is far better for GR-S than for natural rubber (32,46,51,66). The electrical properties of GR-S compare favorably with those of natural rubber.

GR-S LATEX

At the beginning of the rubber program all work was concentrated on making a satisfactory solid polymer but development work on synthetic rubber latex was intensified as the rubber situation improved.

At first GR-S Type 1 and 2 latices were put on the market. These were latices from which the standard grade of solid GR-S is obtained by coagulation. Type 2 latex is different from Type 1 inasmuch as the antioxidant is omitted. These types were not too satisfactory as the dried film lacked greatly in tensile strength.

GR-S Type 3 latex, the most widely

used at the present time, is made with a butadiene-styrene ratio of 50:50 compared to the 75:25 ratio of types 1 and 2. The reaction is also carried further to completion in the Type 3 latex.

With GR-S Type 3 latex, compounds with over 2,000 psi tensile and 600-700% elongation can be prepared. Recently a synthetic resin in water dispersion ("Marmix") has been placed on the market which when added in small proportions to GR-S Type 3 latex, will boost tensiles to about 3,000 psi.

Zinc dithiocarbamates, and a new accelerator for latex work (Setsit No. 5), in conjunction with sulfur, will give satisfactory cures for GR-S latex compounds at low curing temperatures (212°F and lower) and short curing cycles.

GR-S RECLAIM

Much work is yet to be done on the reclaiming of GR-S. The contest sponsored by the Chicago Rubber Group on reclaiming of synthetic rubbers, which has just been concluded, should contribute greatly to the solution of the many existing problems. Generally speaking, GR-S reclaim is inferior to natural rubber reclaim in tear resistance, and slower curing, but compares to its natural counterpart in tensile strength, modulus and elongation. (48)

POSTWAR MARKET

As natural rubber becomes available in increasing quantities the top question is: What chance will synthetic rubber have in competing with the natural product?

The distribution of rubber during peacetime in the various fields of application has been estimated (20) at

Highway Transportation	75%
Mechanical Rubber Goods	10%
Footwear	6%
Wire and Cable Insulation	4%
All other	5%

The above figures indicate that any elastomer must compete with natural rubber in one application primarily, that of tires for automobiles. The high heat build-up, low tear resistance, and tendency to crack, are big handicaps which GR-S must overcome. However, when the accomplishments of the last few years are considered, there is little doubt that these disadvantages can be overcome.

Substituting dichlorstyrene for styrene in the regular GR-S formula has improved the physical strength of the polymer at elevated temperatures (2,41). Furthermore the use of small quantities of natural rubber in tire building overcomes most of the difficulties encountered in 100% GR-S tires.

Natural rubber could probably be modified to overcome some of these weak points, such a process would increase the cost and lessen its chances to compete with a synthetic product. Depending chiefly on the raw material cost, the price of synthetic is widely estimated to be from 10-14¢ per pound. Removal of restrictions, modernizing equipment and generally increased efficiency, natural rubber should be available at prices close to that of the synthetic product. Some very optimistic estimates have been made which claim profitable production at 4¢ per pound for natural rubber can be produced profitably (35).

It is difficult to forecast developments, but it appears unlikely that natural rubber will ever entirely replace the synthetic material.

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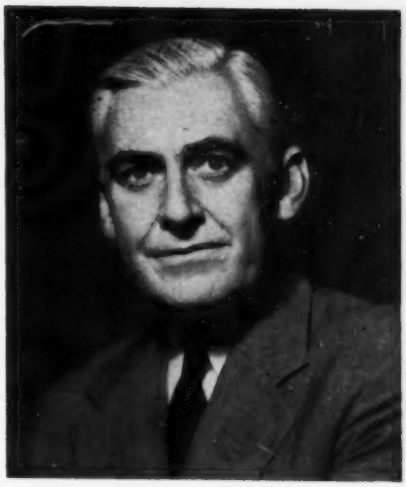
Comparative Properties of Natural Rubber and GR-S

Property	*Nat'l Rubber*	*GR-S*
Specific gravity	0.92	0.94
Tensile Strength—psi		
no fillers	3000-5000	400- 700
organic fillers	2500-3500	600-2000
Carbon fillers	3500-4500	2000-3500
Elongation (%)	550- 800	500- 650
% Loss in Tensile Strength from room temp. to 200° F.	35	66
Tear Resistance lb./in.	650	250
Flexing life of Carbon Black Loaded Stocks	good	fair
Low Temperature Flexibility	good	cracks at —55°C
Abrasion Resistance	fair	good
Aging Oxygen	fair	excellent
Heat	fair	excellent
Oil and Solvent Resistance	poor	poor to fair
Power factor (%) pure gum	0.16-0.18	0.12-0.18
Dielectric Constant pure gum	2.4-2.7	2.4-2.7

Finished Ameripol tire of the B. F. Goodrich Co., the first automobile casing to be made entirely from American materials.

HEADLINERS in the NEWS

W. A. LALANDE, JR., has been appointed director of Penn Salt's Whitemarsh Research Laboratories. Dr. Lalande was formerly research director of Attapulgus Clay Co.



ROBERT PRICE RUSSELL, head of Standard Oil (N. J.) central technical and research organization, has been named 1946 gold medalist of American Institute of Chemists.

EDWARD A. O'NEAL, Jr., former production manager of Monsanto phosphates, who has been appointed deputy managing director of Monsanto Chemicals Ltd., England.

HENRY E. PERRY, formerly vice-president in charge of production of Commercial Solvents Corp., has been elected executive vice-president of the company.

ALDEN HAYES EMERY has been elected secretary and business manager of the American Chemical Society to succeed Dr. Charles L. Parsons who retired on December 31.

W. ALBERT NOYES, JR., chairman of the chemistry department of the University of Rochester, has been elected president of the American Chemical Society for 1947.

JOSEPH A. NEUBAUER, former superintendent of the DPC Natrium chlorine works, has been appointed technical adviser to Columbia Chemicals with Pittsburgh headquarters.

Glenn T. Seaborg, co-discoverer of plutonium and elements 95 and 96, named outstanding young man of Chicago for 1945 by Chicago Junior Association of Commerce.

Thirty-seven room "Brandywine," Briarcliff Manor, N. Y., purchased by Centro Research Laboratories Inc. and converted into consulting industrial laboratories. In addition to the main manor there are six other adaptable buildings on the 27 acre estate.

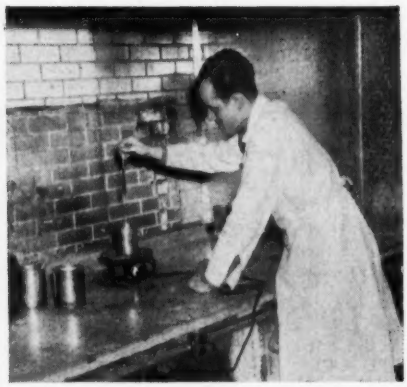
H. E. Smith, director of Centro Research Laboratories Inc.

Centro Converts Estate to Research Laboratories

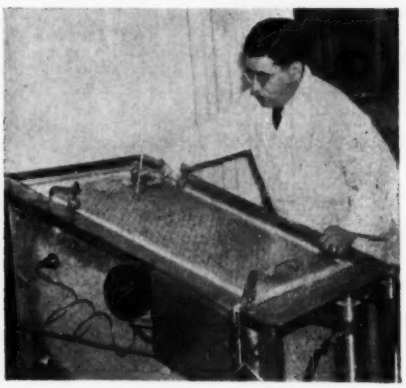
Centro Research Laboratories Inc. recently purchased the Brandywine estate, Briarcliff Manor, N. Y., and has completed its conversion into an industrial research laboratory.

Officials state that the estate lent itself very readily to conversion, with the cost of remodelling totalling only about $50,000. Actually, within six weeks of the acquisition

Physicist D. M. O'Halloran, assistant director of Centro Laboratories.



Virgil M. Vedda using the six foot wide fume cabinet—erstwhile chef's headquarters.



Salt spray chamber installed in the original laundry room. H. Glass is the operator.

Walker Hardin in his leaded-pane plastics lab.—formerly an upper bedroom.

Dixon Farley sprays paint test panels in what was the Brandywine coal storage bin.

Corner of laboratory for testing porosity and insulation value of coatings.

Front view of Brandywine showing the main section of the manor, now converted to research laboratories. The balcony affords a beautiful view of the surrounding country.

Brandywine's main living room (entrance at left) which now constitutes Centro's general offices. The conference hall, executive offices, and library are directly adjacent.

of the property, equipment had been transferred from Brooklyn and research projects were under way at the new laboratories.

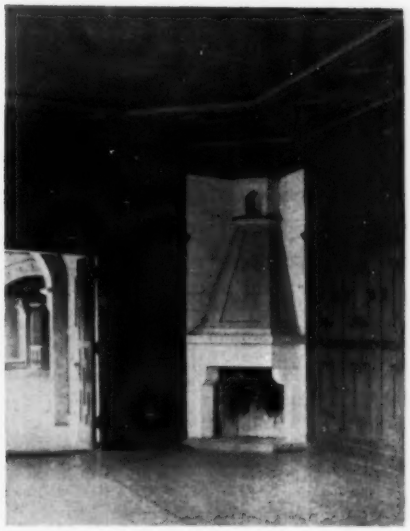
Brandywine consists of the 37 room Tudor Manor style main house and six affiliated buildings on 27 acres of landscaped grounds including tennis courts, swimming pool, etc. The buildings have tile floors throughout, numerous, large windows, and are completely fireproof.

At present all these buildings are being fully utilized, and the greenhouses are being adapted to provide "tropical climates" for biological and corrosion research.

Forty-five technologists, and five maintenance men, are employed in the laboratories.

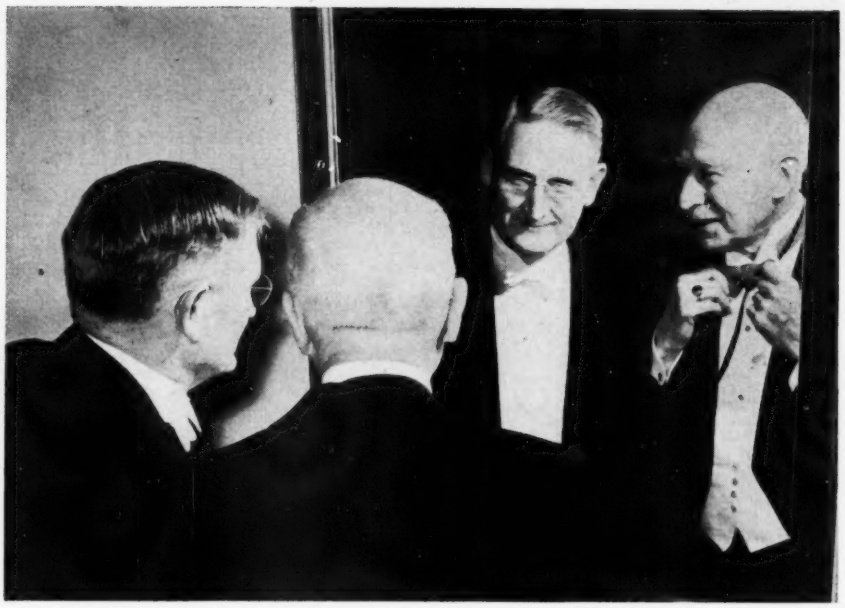
Stables, now an auxiliary water supply tower, solvents storage unit, and machine shop.

By the mere installation of extra shelves the butler's pantry became the pigments storage section. Bulk quantities, and flammable solvents are kept in the former stables.



Corner of the panelled dining room—converted into Centro's main conference hall.

Perkin Medal Dinner



Francis C. Frary (left), 1946 recipient of the Perkin Medal and director of research, Aluminum Co. of America, looks on as Marston T. Bogert (right), emeritus professor of chemistry, Columbia University, adjusts his famous mauve tie. The tie was dyed with a batch of aniline mauve according to the Perkin patent when Sir William and Lady Perkin were honored in New York in 1906—the fiftieth anniversary of the founding of the industry. Dr. Bogert has worn the tie at all Perkin medal Award dinners.

Du Pont Promotions

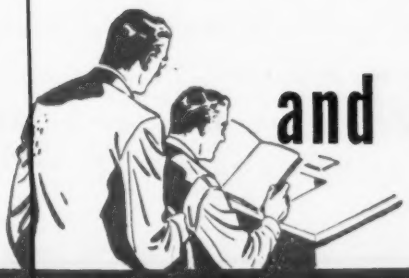
W. S. Carpenter, Jr., president of du Pont, and B. M. May, manager of the Rayon Dept., congratulate the first three scientists promoted under a plan creating a new series of du Pont research positions. The plan provides for three classifications of research associates, with unusual individual prerogatives in selecting fields of research, without the distraction of administrative routine.

Left to right: E. V. Lewis, Nylon Research, Wilmington; W. E. Roseveare, Viscose Rayon, Richmond, Va.; E. F. Izard, Pioneering Research, Buffalo; Mr. Carpenter and Mr. May.

Chicago Drug Group

Personalities at the annual Chicago Drug and Chemical Association dinner at the Drake Hotel, include, in the usual order: Dale Ruedig, Eli Lilly; Joe Shine, secretary of Illinois Pharmaceutical Association; Harry Dunning, club president; and Faus J. Solon, vice-pres. Owens-Illinois Glass Co.

NEW and now available



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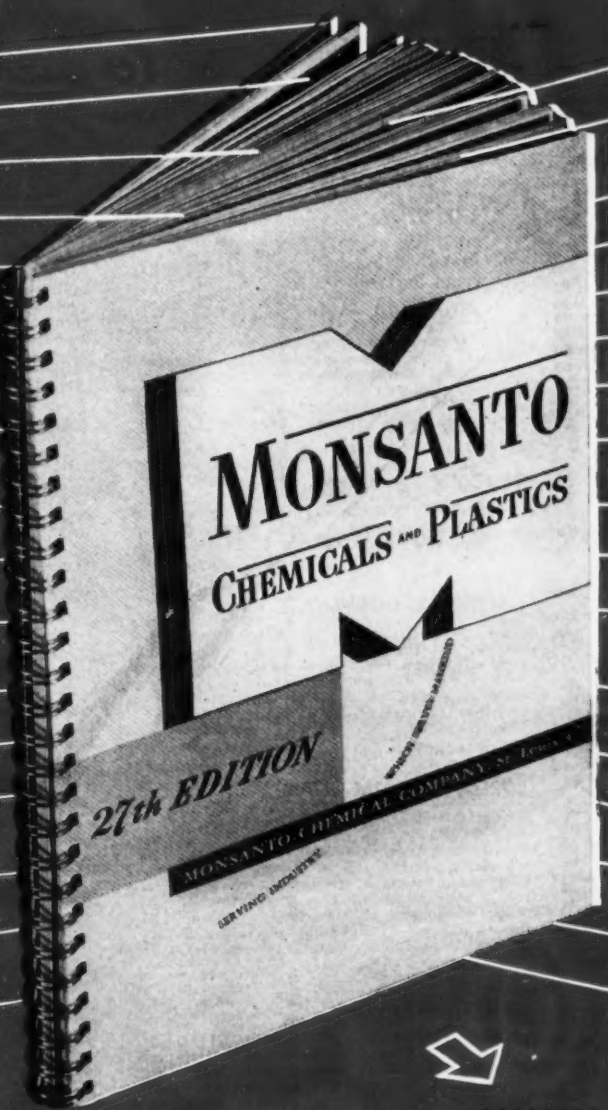

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NEW CHEMICALS FOR INDUSTRY

Chemical Industries *here supplements the catalog of new chemicals and chemical specialties introduced by its advertisers during 1944-5, published in the November, 1945, issue. These products as well as those described in the November, 1945, issue will be displayed in* Chemical Industries' *exhibit at the 20th Exposition of Chemical Industries, Grand Central Palace, New York, February 25 to March 2, 1946.*

6-AMINOQUINOLINE

$(NH_2)C_9H_6N$. Mol. Wt., 144. Forms crystalline hydrate with $2H_2O$ from water. Anhydrous base; M.p. 114°, B.p. 187°/11 mm. Soluble ethyl alcohol, ether; sparingly soluble in water, ligroin; sublimes. Suggested uses: Intermediate for dyes and pharmaceuticals. Available only in small quantities for experimental investigation. Evans Chemetics, Inc.

8-AMINOQUINOLINE

$(NH_2)C_9H_6N$. Mol. Wt., 144. Yellow crystals from EtOH or ligroin. M.p. 70° C. B.p. 160°/22 mm. Soluble in water, volatile with steam. Suggested uses: Intermediate for dyes and pharmaceuticals. Available only in small quantities for experimental investigation. Evans Chemetics, Inc.

e-AMINOCAPROIC ACID

$NH_2(CH_2)_5COOH$. M. p. sinters at 195° C. White cryst.; sol. in water and sl. sol. in methanol; insol. in ethanol. Suggested use: Intermediate for pharmaceuticals and plasticizers. Available in research quantities. E. I. du Pont de Nemours & Co., Inc.

AMMONIUM FERROCYANIDE (25% Solution)

$(NH_4)_4Fe(CN)_6 \cdot 4H_2O$. Mol. Wt., 356.11; Sp. Gr., 1.088. A clear lemon yellow solution containing 25% $(NH_4)_4Fe(CN)_6 \cdot 4H_2O$ which is stable at ordinary temperatures out of contact with air. Chemical properties: $Fe(CN)_6$ will react with metallic salts to form insoluble ferrocyanide. NH_4 radical can be replaced by metallic hydroxides to form the corresponding metallic ferrocyanide, with the liberation of ammonia. Suggested uses: Removal of heavy metals from solutions where the presence of alkali or alkaline earth ferrocyanides would be objectionable. May be used in preparing normal metallic ferrocyanides of those metals which normally form double salts with sodium, potassium or calcium ferrocyanide. Henry Bower Chemical Manufacturing Company.

BARIUM ARSENITE

$Ba(AsO_2)_2$. This reagent is a strong reducing chemical and is available in the chemically pure grade. Eimer & Amend.

BARIUM CARBONATE

$BaCO_3$. This reagent is now available in a much more economical grade than the barium carbonate as specified by the American Chemical Society. Its strontium and calcium content are slightly higher than the ACS limit of 0.3%. It can, however, be used wherever those impurities will not interfere. It is an E. & A. Tested Purity Reagent with the exact analysis stated on the label. Eimer & Amend.

BARIUM RICINOLEATE

$Ba[OOC(CH_2)_7CH = CHCH_2CHOH(CH_2)_5CH_3]_2$. Mol. Wt. 727.0. Moderately hard, waxy soap. Commercial uses: Compounding of waxes, greases, lubricants, and gasket pastes. Available in experimental quantities. Fine Chemicals Div., The Baker Castor Oil Co.

BUTYL UNDECYLENATE

$Ca\text{—}SCH_2COO \cdot 3H_2O$. Mol. Wt., 184.16. B. P., 130°C @ 3.5 mm.; Sp. Gr., 0.872 20°/15°. Fatty ester possessing terminal unsaturation which permits reactions characteristic of the ethylenic linkage. Available in experimental quantities. Fine Chemicals Div., The Baker Castor Oil Co.

BENZHYDROL (Diphenyl Carbinol)

$(C_6H_5)_2CHOH$. Mol. Wt., 184.22. White cryst. solid melting at 64-65°C (Tech.), 68-69°C (Pure). Insol. in water; very sol. in alcohol, ether, carbon disulfide and chloroform; sl. sol. in cold petroleum ether. Suggested uses: Chemical intermediate for the preparation of plasticizers, pharmaceuticals and insecticides; textile lubricant. General Chemical Co.

BENZOIN

$C_6H_5COCHOHC_6H_5$. This organic compound is for use in research as a preservative and for medical research. Eimer & Amend.

o-BIPHENYL ISOCYANATE

$o\text{-}C_6H_5C_6H_4NCO$. Mol. Wt., 195.2; Dist. Range, 140-150°C. @ 8 mm. Color, slight yellow. Gives the typical isocyanate reactions with water, alcohols and amines. Suggested uses: Synthesis of plasticizers, pharmaceuticals and textile treating agents. Monsanto Chemical Company.

BORON FLUORIDE—ETHER COMPLEX

$(C_2H_5)_2O \cdot BF_3$. Mol. Wt., 141.94; M. P., —60°C; B. P., 126°C. Sp. Gr., 1.14 at 25°C. The technical product offered is a dark liquid containing 48-50% BF_3 (theory 47.8%) and boiling over a range of temperature. Suggested uses: as catalyst in the preparation of synthetic plastomers and elastomers, in the bodying of oils and in alkylation reactions. Limited quantities available. General Chemical Co.

n-BUTYL NITRATE

$CH_3(CH_2)_3ONO_2$. B. Range, 133-137°C. (760 mm.). A pale yellow liquid that is insol. in water but sol. in ethanol and ether. Suggested uses: Fuel additive and solvent. Available in ton lots. E. I. du Pont de Nemours & Co., Inc.

CADMIUM FLUOBORATE SOLUTION

$Cd(BF_4)_2$ solution. Typical analysis: 50.0% $Cd(BF_4)_2$, 19.6% Cd, 2.9% free HBF_4, 1.0% free H_3BO_3. A colorless liquid, Sp. Gr. 1.60 at 20°C (13.3 lbs. per gallon), pH 1-2. The concentrate, diluted to proper strength and plating assistants added, produces a bath suitable for the relatively rapid electroplating of cadmium at high current efficiency. Limited quantities are available. General Chemical Co.

CALCIUM THIOGLYCOLATE

$CaSCH_2COO \cdot 3H_2O$. Mol. Wt., 184.16. White powder, sol. in water; sl. sol. in alcohol and chloroform. Slowly loses water of crystallization above 95°; darkens at 220°; partially fuses and decomposes at 280-290°. Suggested uses: Dehairing of hides; depilatory. Available in commercial quantities. Evans Chemetics, Inc.

e-CAPROLACTAM

$NH(CH_2)_5CO$. B. P., 136-138°C. at 10 mm.; M. P., 68.8°C. White cryst. solid sol. in water, acetone, ethanol, benzene and chloroform but only sl. sol. in carbon tetrachloride and ether. Suggested use: In plastics, pharmaceuticals and as a plasticizer, and organic intermediate. Available as a cast solid or as 60-80% aqueous solution in ton lots. E. I. du Pont de Nemours & Co., Inc.

CARBAMIDE PHOSPHORIC ACID

$(NH_2COHN_2 \cdot H_3PO_4)$: Mol. Wt., 158, Sp. Gr., 1.759, M. P. 117.5° C. Small, uniform, colorless, odorless crystals. Very sol. in water and alcohol. Its aqueous solution titrates like free phosphoric acid. A solid phosphoric acid in a form convenient for shipping and handling which is useful as an acidulent in food and beverage industries, as a fireproofing compound, and in cleaning compositions. Victor Chemical Works.

CHLOROFORM (Anhydrous)

This American Chemical Society reagent grade chloroform has been dehydrated until the moisture content is less than 0.002%, (determined by Karl Fischer titration using Fisher Titrimeter). The reagent is extremely useful where a truly anhydrous organic solvent is desired. Its principle uses in the past have been for preparation of standard cholesterol solutions and for fat extractions where water soluble substances are to be guarded against. Eimer & Amend.

CHLORPROPANEDIOLS (Glyceryl Monochlorhydrins)

$ClCH_2CHOHCH_2OH$ }
$CH_2OHCHClCH_2OH$ } Mol. Wt. 110.54; Sp. Gr., 1.3233 @ 20/20 °C.; B. P., 148°C. @ 50 mm. (decomposes @ 760 mm.). Fr. P., sets to a glass below —40 °C. Vapor pressure, 0.02 mm. Hg @ 20°C. Miscible with water in all proportions. A mixture consisting primarily of 1-chlorpropanediol-2, 3 together with some 2-chlorpropanediol-1, 3. The reactions of both components are quite similar. The chlorine atom can be readily replaced, leading to the formation of mercaptans, glyceryl amines, and ethers. Both hydroxyl groups can be esterified. May be converted into the interesting glycidol by treatment with alkaline reagents. A promising intermediate for the introduction of the glyceryl group and may be of interest to dye, pharmaceutical, and synthetic resin manufacturers. Carbide and Carbon Chemicals Corp.

COBALT FLUOBORATE SOLUTION

$Co(BF_4)_2$ solution. Typical analysis: 48.0% $Co(BF_4)_2$, 12.1% Co, 3.0% HBF_4, 2.1% H_3BO_3. A blue liquid, Sp. Gr. 1.56 at 25°C (13 lbs. per gallon), pH 1-2. The concentrate, easily diluted to proper strength and with suitable plating assistants added, produces an electroplating bath which may be used at high current density with quantitative current efficiency. Limited quantities available. General Chemical Co.

COPPER FLUOBORATE SOLUTION

$Cu(BF_4)_2$ solution. Typical analysis: 44.5% $Cu(BF_4)_2$, 11.9% Cu, 1.3% HBF_4, 4% H_3BO_3. A blue liquid, Sp. Gr. 1.53 at 20°C (1.28 lbs. per gallon), pH 1-2. The concentrate, easily diluted to proper strength and without plating assistants, produces an electroplating bath which may be used at high current density with quantitative current efficiency, and at the same time having exceptional simplicity of control. Commercial quantities are available. General Chemical Co.

CRESYL DIGLYCOL CARBONATE

$(C_7H_7OC_2H_4)_2O$. Mol. Wt., 374.4. Sp. Gr., 20/4, 1.189; R. I., $n_{20}D$ 1.5229; B. P., 247-248°C. at 2.0 mm. Hg.; Viscosity at 20°C., 2170 centipoises. Volatility at 100°C., less than 0.01 mg. loss per sq. cm. per hr. Sol. in water at 25°C., less than 0.01% by weight. Relatively stable to hydrolysis by water. Yields diethylene glycol, cresol, and carbon dioxide when hydrolyzed. Sol. in many organic solvents, and compatible with many resins and polymers. Odor, practically none. Suggested uses: As a plasticizer, solvent, or softening agent of low volatility, and in pharmaceutical and lubricant compositions. Available in commercial quantities. Columbia Chemical Division, Pittsburgh Plate Glass Company.

CUPRIC FLUORIDE

$CuF_2 \cdot 2H_2O$. Ml. Wt. 137.60; Sp. Gr. 2.93; Typical Analysis: 96% $CuF_2 \cdot 2H_2O$ basis fluorine analysis; monoclinic blue crystals sl. sol. in cold water, sol. in acids and alcohol, insol. in acetone. Suggested uses: as a mold preventive in textiles, as a fungicide, as a flux and coloring material in the manufacture of ceramics. Sample quantities available. General Chemical Co.

CUPRIC ORTHOPHOSPHATE

$Cu_3(PO_4)_2$. Free flowing, micro-crystalline blue-green powder. Insol. in water; sol. in mineral acids. Suggested uses: Insecticide, anti-fouling agent. Monsanto Chemical Co.

CYCLOHEXANONE OXIME

$C_6H_{10}NOH$. M. P., 90°C. A white crystalline solid. Sl. sol. in water; sol. in ether and ethanol. Suggested uses: As an organic intermediate and a fuel additive. Available in ton lots. E. I. du Pont de Nemours & Co., Inc.

n-DECYL ACETATE

$CH_3COO(CH_2)_9CH_3$. Mol. Wt., 200.19; Sp. gr., 0.8635-0.8645, 25°/25°C; R. I., 1.4275-1.4285 @ 20°C; B. P. 98°-100°C, 5 mm. Hg. Color, white. Odor, orange character. Chemical properties: stable ester. Suggested uses: perfume and flavor ingredient. Available in 10 lb lots. Givaudan-Delawanna Inc.

N-n-DECYLETHYLENEDIAMINE

$H_2NCH_2CH_2NHC_{10}H_{21}$. Mol. Wt., 200. White, waxy solid. M. P., 36-37° C. Insoluble in **water; soluble in alcohol, ether, chloroform, benzene. Dihydrochloride: $C_{12}H_{28}N_2 : 2HCl$. Mol. Wt., 273. White prisms (from alcohol). M. P., 220-222° dec. Suggested uses: Detergent, intermediate. Available only in small quantities for experimental investigation. Evans Chemetics, Inc.**

DIAMMONIUM ACID PYROPHOSPHATE

A white, granular, free-flowing, hygroscopic solid, very soluble in water and dilute mineral acid. Reverts to orthophosphate in water solution, more rapidly at elevated temperatures. pH of 1% solution, 4.7. Approximate composition: $(NH_4)_2H_2P_2O_7$. Suggested use: Flame proofing; water softening. Monsanto Chemical Company.

DIAMMONIUM ACID TETRAPHOSPHATE

A white, hygroscopic solid, semi-plastic at normal temperatures. Fluidity increases with increasing temperatures. Very sol. in water and dilute mineral acids. Reverts to orthophosphate in water solution, more rapidly at elevated temperatures. pH of 1% solution, 2.2 Approximate composition: $(NH_4)_2H_4P_4O_{13}$. Suggested use: Flame proofing; water softening. Monsanto Chemical Company.

DIAMMONIUM ACID TRIPHOSPHATE

A white, hygroscopic solid, semi-plastic at normal temperatures. Fluidity increases with increasing temperatures. Very sol. in water and dilute mineral acids. Reverts to orthophosphate in water solution, more rapidly at elevated temperatures. pH of 1% solution, 2.4. Approximate composition: $(NH_4)_2H_3P_3O_{10}$. Suggested use: Flame proofing; water softening. Monsanto Chemical Company.

DIBENZYLDISULFIDE

$(S \cdot CH_2 \cdot C_6H_5)_2$. Mol. Wt., 246.4. Fine, white powder, M. P., 69-70°C. Insol. in water; sol. in ether, benzene, and hot ethanol. Suggested uses: Rubber accelerator; intermediate in organic syntheses. Available in small quantities for experimental investigation. Evans Chemetics, Inc.

4,4'-DICHLOROBIPHENYL

$C_{12}H_8Cl_2$. Mol. Wt., 223.10; Dist. Range, 313-316.5° C. @ 760 mm. (uncorr.); M. P., 148-149° C. White cryst. solid. Sl. sol. in alcohol, can be recryst. from benzene or glacial acetic acid. Suggested uses: Intermediate for dyes. Monsanto Chemical Company.

1,1-DIFLUORO-3,3-DICHLOROPROPENE-2

$CF_2HCH{=}CCl_2$; Mol. Wt., 146. 93, B. P., 90°C. at 760 mm. Colorless liquid of sharp, penetrating odor. Used as raw material for preparation of difluoroacetic acid, its esters, and the sodium salt. Available in limited quantities. Columbia Organic Chemicals Co.

1,1-DIFLUORO-1,2,3-TETRACHLORO-PROPENE-2

$CF_2ClCCl{=}CCl_2$; Mol. Wt., 215.83; B. P., 126°C. at 760 mm. Colorless liquid having sharp disagreeable odor. Decomposes slightly on standing with formation of hydrofluoric acid. May be oxidized with difficulty to yield the sodium and potassium salts of difluoromonochloroacetic acid. Prepared to order. Columbia Organic Chemicals Co.

DIGLYCOL CARBAMATE

$(H_2NCO_2C_2H_4)_2O$. Mol. Wt., 192.2. Physical state, white cryst. M. P., 149-150°C. Solubility in water at 25°C., 0.7% by weight; at 100°C., 60% by weight. Solubility limited in most organic solvents. Odor, none. Condenses with formaldehyde to produce resinous products. Suggested uses: For the production of synthetic resins; as a modifier for phenol-, urea-, and melaminealdehyde resins for improvement of properties such as flexibility and strength. Available in semi-commercial quantities. Columbia Chemical Division, Pittsburgh Plate Glass Company.

DIGLYCOLLIC ACID

$COOH\text{-}CH_2\text{-}O\text{-}CH_2COOH$. M. Range, 141.5-144.5°C. A white crystalline monohydrate that can be dehydrated at 90-100°C. Ionization constant K. = 1.1 x 10^3 (25°C.). Sol. in water and ethanol and only sl. sol. in ether. Suggested uses: In plastics, as plasticizers and as an intermediate for pharmaceuticals. Available in research quantities. E. I. du Pont de Nemours & Co., Inc.

2,2'-DIHYDROXY-1,1'-DINAPHTHYLMETHANE-3,3'-DICARBOXYLIC ACID

$(OH) \cdot (COOH)C_{10}H_5CH_2C_{10}H_5(OH)(COOH)$. Mol. Wt., 388. Yellow needles, m.p. 300°+. Insoluble in water, alcohol, acetic acid, ether, and benzene; soluble in alkalis, carbonates and bicarbonates. Suggested uses: Pharmaceuticals, dyes. Available only in small quantities for experimental investigation. Evans Chemetics, Inc.

2,4-DINITRODIPHENYLAMINE

$C_6H_5NHC_6H_3(NO_2)_2$. M. P., 149.3°C. Dark red cryst.; sol. in toluene. Suggested use: Pesticide and dye intermediate. Available in research quantities. E. I. du Pont de Nemours & Co., Inc.

2,4-DINITROTHIOPHENE

$(NO_2)_2C_4H_2S$. Yellow needles (from alcohol). M. P., 52-54°. Insoluble in water. Suggested uses: Intermediate. Available only in small quantities for experimental investigation. Evans Chemetics, Inc.

DIPHENYL DISULFIDE

$(C_6H_5)_2S_2$. Mol. Wt., 218.32. Colorless t

slightly yellow cryst. solid melting at 55-58°C. Insol. in water; sol. in the common organic solvents; sl. sol. in cold petroleum ether. Suggested uses: insecticide, fungicide, lubricant addition agent; chemical intermediate for the preparation of phenyl sulfur compounds. General Chemical Co.

DIPHENYL SULFIDE

$(C_6H_5)_2S$. Mol. Wt., 186.26; Sp. Gr., 1.635 at 18°C. Colorless to light yellow highly refractive oil, sol. in the common organic solvents but insol. in water. B Range, 198-194°C at 53 mm. Lg. Suggested uses: Insecticide, antioxidant, rubber softener, lubricant addition agent, chemical intermediate for synthesis of dielectrics and lubricant addition agents. Samples available. General Chemical Co.

DITHIODIGLYCOLIC ACID

$(SCH_2COOH)_2$. Mol. Wt., 182.06. White crystalline solid, odorless, non-hygroscopic; M. P., 107-108°C. Readily sol. in water, alcohol, ethyl acetate, ether, and acetone; sl. sol. in chloroform, toluene, and petroleum ether. Suggested uses: Rubber accelerator, intermediate in pharmaceuticals, organic synthesis. Available in small quantities for experimental investigation. Evans Chemetics, Inc.

N-n-DODECYLETHYLENEDIAMINE

$H_2NCH_2CH_2NHC_{12}H_{25}$. Mol. Wt., 228. White, waxy solid. M. P., 36-38° C. Insoluble in water; soluble in ether, chloroform, benzene, alcohol. Dihydrochloride, $C_{14}H_{32}N_2 \cdot 2HCl$. Mol. Wt., 301. Colorless prisms (from alcohol). M. P., 222-224° dec. Suggested uses: Detergent, intermediate. Available only in small quantities for experimental investigation. Evans Chemetics, Inc.

ETHANE SULFONIC ACID

$C_2H_6SO_3H$. Mol. Wt., 110. Sp. Gr., 1.33 (d25/4). B. P., 127°C. (1.5 mm.). Solubility in water and alcohol, complete; benzene, 9.6; hexane 0.2. PH of 1% solution, 1.10. 95+% Ethane sulfonic acid. H_2SO_4 content, <1%; water content, <2%; ash, <.05. Odor mild. Color, yellow. State, oily liquid. Chemical properties: Non-oxidizing strong acid, inert to halogens, forms acid chlorides, esters and water soluble salts, attacks common metals, unreactive toward aromatics and paraffins, inert to hydrolysis. Decomposes below the atmospheric boiling point. Suggested uses: For preparation of salts and derivatives of novel properties. For example, heavy metal salts are water soluble. As modified catalyst in reactions normally catalyzed by sulfuric and aryl sulfonic acids. Also in electroplating and as a selective solvent. Available in small quantities for experimental research purposes. Chemical Products Department, Standard Oil Company (Ind.).

ETHYL DIFLUOROACETATE

$CF_2HCOOC_2H_5$; Mol. Wt., 124.05. Colorless liquid having powerful fruity odor. B. P., 99°C. Sl. sol. in water and very sol. in alcohol. The ester has been carefully freed of water and alcohol. Available in experimental quantities. Columbia Organic Chemicals Co.

ETHYL SILICATE 40

Specifications: Sp. Gr., 1.050 to 1.070 @ 20/20°C. B. Range at 760 mm. Hg, none below 80°C. and not more than 5% below 110 °C. Available silica as SiO_2, 38 to 42% by wt. Maximum acidity as HCl, 0.10% by wt. Flash Point, 90 °F. (open cup). A partially hydrolyzed ethyl silicate containing about 40 per cent available silica. A light-brown, mild-odored liquid which undergoes the hydrolysis, dehydration, and polymerization reactions characteristic of ethyl silicate. A convenient, more economical source of adhesive silica suggested for use as a building preservative, as a binder for refractory materials, in the formulation of heat-resistant surface coatings, and as a gelling agent for alcohol fuels—wherever high silica-depositing solutions are desirable. Carbide and Carbon Chemicals Corp.

ETHYL TRIFLUOROACETATE

$CF_3COOC_2H_5$; Mol. Wt., 142.09. Colorless liquid having powerful fruity odor. B. P., 61.5°C. Sl. sol. in water and very sol. in alcohol. This ester has been carefully freed of both water and alcohol which are the usual contaminants. Available in limited quantities. Columbia Organic Chemicals Co.

ETHYLENE-BIS-GLYCOLLIC ACID

$COOH\text{-}CH_2OCH_2CH_2OCH_2COOH$. M. Range, 65-70°C. A white cryst. solid; very sol. in water. Suggested use: As an intermediate for plastics, plasticizers and dyes. Available in research quantities. E. I. du Pont de Nemours & Co., Inc.

FERROPHOSPHORUS (Superfine)

Dark gray to black, dense powder. Insol. in water and dilute acids. Particle size less than 10 microns. Suggested use: As pigment. Monsanto Chemical Company.

FERROUS FLUOBORATE SOLUTION

$Fe(BF_4)_2$ solution. Typical analysis: 45.1% $Fe(BF_4)_2$, 11.0% Fe, 1.9% HBF_4, 5.0% H_3BO_3. A light green liquid, Sp. Gr. 1.56 at 20°C (13 lbs. per gallon), pH 1-2. The concentrate, easily diluted to proper strength and with suitable plating assistants added, produces an electroplating bath which may be used at high current density with quantitative current efficiency. Commercial quantities are available. General Chemical Co.

FLUOSULFONIC ACID, Tech.

FSO_3H. Mol. Wt. 100.07; M. P., —87.3°C; B. P., 165.5°C; Sp. Gr. 1.743 at 15.6°C; Viscosity, 1.7 centipoises at 20°C. An oily liquid assaying 94% FSO_3H, min. Fluosulfonic is a corrosive liquid similar in physical appearance to sulfuric aicd. Suggested uses: in the preparation of boron fluoride, aromatic sulfonyl fluorides, acyl fluorides, alkyl and aryl fluosulfonates, and sulfamido acids; as catalyst in condensation, polymerization, and alkylation reactions. Commercial quantities immediately available. General Chemical Co.

FORMYLDIPHENYLAMINE

$C_6H_5N(CHO)C_6H_5$. B. P., 149-151°C. at 1.5 mm.; M. P., 71-72°C. Sol. in alcohol and benzene, but insol. in water. Suggested use: As a pesticide, organic intermediate and stabilizer for fats, vegetable oils and lubricants. Available in research quantities. E. I. du Pont de Nemours & Co., Inc.

HEPTALDEHYDE

$CH_3(CH_2)_5CHO$. Mol. Wt., 114.18; B. P., 155°C; Sp. Gr., 0.833 20°/15°. Colorless liquid with a mild, pungent odor. Suggested uses: Preparation of various heptyl derivatives, intermediates, pharmaceuticals, synthetic aromatic chemicals. Available in commercial quantities. Fine Chemicals Div., The Baker Castor Oil Co.

HEPTYL ACETATE

$CH_3(CH_2)_5CH_2OOCCH_3$. Mol. Wt., 158.23; B. P., 190°C.; Sp. Gr., 0.875 20°/15°. Colorless liquid with a pleasant floral odor. Useful in perfume chemistry or as a solvent. Available in experimental quantities. Fine Chemicals Div., The Baker Castor Oil Co.

METHYL UNDECYLENATE

$CH_2{=}CH(CH_2)_8COOCH_3$. Mol. Wt., 198.18; B. P., 75°C. @ 2.0 mm.; Sp. Gr., 0.886 20°/15°. Fatty ester possessing terminal unsaturation which permits reactions characteristic of the ethylenic linkage. Available in experimental quantities. Fine Chemicals Div., The Baker Castor Oil Co.

n-HEPTYL ALCOHOL

$CH_3(CH_2)_5CH_2OH$. Mol. Wt., 116.2; B. P., 46°-50°C. @ 20 mm.; Sp. Gr., 0.818 20°/15°. Colorless liquid with a pleasant, fruity odor. Suggested uses: preparation of heptyl esters, intermediates, pharmaceuticals, synthetic aromatic chemicals. Available in experimental quantities. Fine Chemicals Div., The Baker Castor Oil Co.

HYDRIODIC ACID

HI. This is a fuming grade of hydriodic acid which was formerly imported and is now made in the United States by Eimer & Amend. It is 70% in strength, has a dark iodine color, and is useful for dissolving the so-called acid-soluble inorganic substances. Eimer & Amend.

β-IONONE PURE
4-(2,6,6 Trimethyl-1-cyclo hexenyl)-3-butene-2-one.

$C_{13}H_{20}O$. β-Ionone, 100%. Mol. Wt., 192.16; Sp. Gr., 0.9409, 25°/4°C.; R. I., 1.5180 @ 25°C., 1.5200 @ 20°C. B. P., 114°C., 3 mm Hg., 104°C., 2 mm Hg., 89°C., 0.8 mm Hg. Semicarbazone, M. P. 148.5-149.5°C. Odor, cedarwood type in concentrated form, violet leaf on dilution. Chemical properties: hydrogenation and condensation, etc., possible due to presence of two double bonds and one carbonyl

group. Suggested uses: Synthesis of pharmaceuticals. Givaudan-Delawanna, Inc.

$C_{13}H_{20}O$. Sample consists of about 75% beta Ionone and 25% alpha Ionone. Mol. Wt., 192.16. Sp. Gr., 0.9420-0.9430, 25°/25° C.; R. I., 1.513 — 1.514 @ 25°C; B. P. 107°-109°C, 3 mm Hg. Odor, same as above. Suggested uses: Synthesis of pharmaceuticals, etc.; ingredient for violet type perfumes. Available in 50 lb. lots. Givaudan-Delawanna, Inc.

ISO-OCTENES

C_8H_{16}. Composition: 98% octenes, about 85% trimethylpentenes, about 50% 2,3,4-trimethylpentenes. Olefin content, not less than 99%. Mol. Wt., 112.2; Sp. Gr. .738(d20/4); R. I. (n 20/D) 1.425; B. Range 101-116°C. (760 mm.) (ASTM 220-235°F.) Insol. in water, sol. in most organic solvents. Contains 0.001% oxidation inhibitor. Odor, mild and characteristic of olefins. Colorless. Chemical properties: Adds hydrogen halides, alkylates aromatics, polymerizes, and other reactions characteristic of the olefin double bond. Suggested uses: As a research chemical and for preparation of derivatives. Available in reasonable quantities for research purposes. Commercial grade available. Chemical Products Department, Standard Oil Company (Ind.).

LORAKYL PHOSPHORIC ACID

A mixture of mono and dialkyl phosphoric acids having approximately the formulas $(C_{12}H_{25})H_2PO_4$ and $(C_{12}H_{25})_2HPO_4$. This product is a tan colored, waxy solid which has a M. P. of about 27° C; Sp. Gr. at 60° C., 0.94. Sol. in alcohol, ether, benzene, ligroin and carbon tetrachloride. With water it forms a cloudy solution and produces a foam. Monsanto Chemical Company.

MENTHYLPHENOL

A terpene hydrocarbon derivative which improves the heat and light stability of ethyl cellulose plastics, film, plastic peel, adhesives and paper coatings. It prevents ethyl cellulose lastics from becoming brittle and minimizes the change in color of moldings. Menthylphenol can also be used as a plasticizer extender with cellulose acetate. Hercules Powder Co.

MERCURY FLUORIDE

$Hg_2F_2 + HgF_2$. Mixed mercurous and mercuric fluorides containing a predominance of mercuric fluoride with a small amount of unreacted HgO. Typical analysis: 85% HgF_2 (78% Hg) basis fluorine content. Suggested uses: as catalyst in fluorination reactions, in the manufacture of disinfectants. Sample quantities available. General Chemical Co.

METHANE SULFONIC ACID

CH_3SO_3H. Mol. Wt., 96; Sp. Gr. 1.48 (d25/4); B. P. 167°C. (10 mm.). Miscible with water, alcohol and ether. PH of 1% solution, 1.05. 95+% Methane sulfonic acid. Water content, <2%; H_2SO_4 content, <1.0%; ash, <.05%. Odor, mild. Color, pale yellow. State, oily liquid. Chemical properties: Non-oxidizing strong acid. inert to halogens, forms acid chlorides, esters and water soluble salts, attacks common metals, unreactive toward aromatics and paraffins, inert to hydrolysis. Decomposes below its atmospheric boiling point. Suggested uses: For preparation of salts and derivatives of novel properties. For example, heavy metal salts are water soluble. As modified catalyst in reactions normally catalyzed by sulfuric and aryl sulfonic acids. Also in electroplating and as a selective solvent. Available in small quantities for experimental research purposes. Chemical Products Department, Standard Oil Company (Ind.).

METHYL ANISATE
Methyl Ester of p-Methoxy Benzoic Acid

$CH_3OC_6H_4COOCH_3$. Mol. Wt., 166.08. B. P., 104-107°C, 3 mm Hg; M. P. 48.0°-48.5° C. Odor, sweet, anise, heliotrope character. Chemical properties: stable, unreactive ester. Suggested uses: ingredient for bouquet type perfumes. Available in 5 to 10 lb. lots. Givaudan-Delawanna Inc.

MIXED ALKANE SULFONIC ACIDS

Predominantly CH_3SO_3H, $C_2H_5SO_3H$, and $C_3H_7SO_3H$. Mol. Wt., 110-120; Sp. Gr., 1.25-1.35(d25/4). Solubility in water and alcohol, complete; benzene 6%; hexane 0.1%. PH of 1% solution 1.15. 95+% Alkane sulfonic acids. H_2SO_4 content <3%; ash <.05; water content <2%. Odor, sour. Color, brown. State, oily liquid. Chemical properties: Non-oxidizing strong acids, inert to halogens, forms acid chlorides, esters and water soluble salts, attacks common metals, unreactive toward aromatics

and paraffins, inert to hydrolysis. Decomposes below the atmospheric boiling point. Suggested uses: For preparation of salts and derivatives of novel properties. For example, heavy metal salts are water soluble. As modified catalyst in reactions normally catalyzed by sulfuric and aryl sulfonic acids. Also in electroplating and as a selective solvent. Available in small quantities for experimental research purposes. Chemical Products Department, Standard Oil Company (Ind.).

MIXED SODIUM AND POTASSIUM TRIFLUOROACETATE

White cryst. solid which decomposes when strongly heated. Sol. in water and alcohol. Reacts with sulfuric acid to give trifluoroacetic acid. When treated with sulfuric acid and ethyl alcohol the ethyl ester of trifluoroacetic acid is obtained. Available in limited quantities. Columbia Organic Chemicals Co.

β-NAPHTHALENE SULFONIC ACID (Technical)

$C_{10}H_7SO_3H$. A light brown crystalline solid in lump or powdered form. M. P., approximately 110°C. Stable. Sol. in water and alcohol. Strong acid. Tentative specifications: Beta-napthalene sulfonic acid, 75-80%. Free sulfuric acid, less than 2%. Water, 20-25%. Water insol., less than 1%. Suggested use: Intermediate in chemical synthesis. Availability: Pilot plant quantities. Monsanto Chemical Company.

α-NAPHTHYL THIOUREA, Tech.

$C_{10}H_7$ $NHCSNH_2$. Mol. Wt., 202.27. Light to dark tan crystal, difficulty sol. in water, ether and cold alcohol, easily sol. in hot alcohol. Alpha naphthyl thiourea, or "ANTU," is an efficient rodenticide, and is particularly effective against the common Norway or Brown rat. The small doses required allow efficient control without undue hazard to warm blooded animals. Samples available. General Chemical Co.

NICOTINIC NITRILE

$C_5H_5N{\cdot}CN$. Mol. Wt., 104. Long needle-like aggregates of colorless prisms; M. P., 49-50°C. Slightly volatile at room temperature. Readily sol. in water, ethanol, ether, benzene; sl. sol. in petroleum ether. Odor reminiscent of bentonitrile. Suggested uses: Intermediate in organic syntheses. Available in experimental quantities. Evans Chemetics, Inc.

NITROBIURET

$NO_2NHCONHCONH_2$. M. P., 165°C. (with decomposition). White cryst. solid; a very weak explosive when confined. Suggested use: Organic intermediate and insecticide. Available in research quantities. E. I. du Pont de Nemours & Co., Inc.

NITROCYCLOHEXANE

$C_6H_{11}NO_2$. B. P., 109°C. at 40 mm. and 205.5-206°C. at 768 mm. (with decomposition). Straw-colored liquid; insol. in water; miscible with most organic solvents. Suggested use: As a selective solvent and organic intermediate. Available in one gallon quantities. E. I. du Pont de Nemours & Co., Inc.

N-(o-NITROPHENYL)-ETHYLENE-DIAMINE HYDROCHLORIDE

$H_2NCH_2CH_2NHC_6H_4NO_2{\cdot}HCl$. Mol. Wt. 217.5. Yellow needles (from dilute HCl) sol. in water. M. P. 262° dec. Suggested uses: Intermediate for dyestuffs and pharmaceuticals. Available only in small quantities for experimental investigation. Evans Chemetics, Inc.

N-n-OCTADECYLETHYLENEDIAMINE

$H_2NCH_2CH_2NHC_{18}H_{37}$. Mol. Wt. 312. White prisms (from dioxane-ligroin). M. P. 64-65°, insoluble in water and ligroin; soluble in alcohol, ether, dioxane, chloroform, benzene. Dihydrochloride: $C_{20}H_{44}N_2 \cdot {}^2HCl$. Mol. Wt. 385. Colorless prisms from alcohol. M. P. 194-196° dec. Suggested uses: Detergent, intermediate. Available only in small quantities for experimental investigation. Evans Chemetics, Inc.

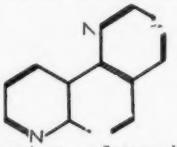
n-OCTYL PHOSPHORIC ACID

A mixture of mono and dioctyl phosphoric acids having approximately the formulas $(C_8H_{17})H_2PO_4$ and $(C_8H_{17})_2HPO_4$. This product is a clear, colorless liquid having a sp. gr. of 0.99. Sol. in alcohol, ether, benzene, ligroin and carbon tetrachloride. Its water solutions are gel-like and when neutralized produce a foam. Monsanto Chemical Company.

PERIODIC ACID

HIO_4. This acid is a strong oxidizing agent for analytical work. It is of a chemically pure grade. Eimer & Amend.

m-PHENANTHROLINE 1,7

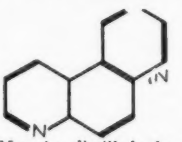


Mol. Wt. 180. Dihydrate, needles, M. P. 65.5°. Anhydrous base, M. P. 78°, B. P. above 360°. Soluble EtOH, hot water, insoluble in ether, benzene ligroin. Suggested uses: Intermediate for pharmaceuticals. dyes. Available only in small quantities for experimental investigation. Evans Chemetics, Inc.

m-PHENANTHROLINE DI-N-OXIDE

$C_{12}H_8N_2O_2$. Mol. Wt. 312. Fine yellow needles (from water). M. P. 192° C.; soluble in hot water, hot alcohol; insoluble in cold water, alcohol, and most organic solvents. Suggested uses: Chemical intermediate. Available only in small quantities for experimental investigation. Evans Chemetics, Inc.

p-PHENANTHROLINE 4,7



Mol. Wt. 180°. Needles from water. M. P. (anhydrous) 172°, sublimes above 100°C. Soluble ethanol, chloroform, benzene; slightly soluble in hot water, ether, carbon disulfide. May be distilled above 360°. Suggested uses: Intermediate for dyes pharmaceuticals. Available only in small quantities for experimental investigation. Evans Chemetics, Inc.

PINACOL (Anhydrous)

$(CH_3)_2C(OH) \cdot C(OH)(CH_3)_2$. Mol. Wt. 118.17; M. P., 43°C; B. P., 173°C; Sp. Gr. 0.967 at 15°C (solid), 0.926 at 60°C (liq.); Flash Point, 77°C; Fame Point, 78°C. Anhydrous pinacol is a white crystalline solid moderately sol. in cold water forming the hydrate; above 46°C pinacol and water are completely miscible. Anhydrous pinacol is sol. in most common organic solvents. Suggested uses: as a plasticizer in cellulose acetate plastic compositions, in the preparation of dimethyl butadiene, in the preparation of esters. Sample quantities are available. General Chemical Co.

PINACOLONE (Methyl tert.-butyl ketone)

$(CH_3)_3CCOCH_3$. Mol. Wt. 100.16; M. P., —49.8°C; B. P., 106°C; Sp. Gr., 0.8114 at 20°C; Flash Point and Flame Point, 12°C. Pinacolone is a colorless liquid with a peppermint-like odor, sl. sol. in water, sol. in most common organic solvents. Suggested uses: as solvent, in organic synthesis involving reaction of the active methyl group, and as intermediate in the preparation of trimethyl acetic acid Small sample quantities available. General Chemical Co.

PLASMOQUINE DI-N-OXIDE-METHYLENE BIS-HYDROXYNAPHTHOATE

$C_{19}H_{29}N_3O_3 \cdot C_{23}H_{16}O_6$. Mol. Wt. 735.5. Small yellow prisms (from dilute acetone); M. P. 278-280° dec. Suggested uses: Specific antimalarial drug. Available only in small quantities for experimental investigation. Evans Chemetics, Inc.

POLYACID FLUORIDES

KF-xHF Complex acid salts of alkali fluorides and hydrofluoric acid containing up to 58% hydrofluoric acid of crystallization, the melting points of the potassium fluoride double salts in which x=2 to 4 ranging from 64-72°C. When heated above their melting points these compounds decompose to yield free HF. Suggested uses: In laundry sours, in the etching of quartz crystals, and as source of HF in the preparation of elemental fluorine by electrolysis of the fused salt. Sample quantities available. General Chemical Co.

POLYAMYLBIPHENYL

A mixture of amylbiphenyls. Viscous yellow oil. Sp. Gr., 0.935 @ 65° C.; R. I., 1.5627 @ 25° C. Viscosity, approximately 9000 SUS @ 100° F. and 175 SUS @ 212° F. Pour point, 20° F. Insol. in water, sol. in organic solvents. Suggested use: Plasticizer. Monsanto Chemical Company.

POTASSIUM THIOSULFATE

$K_2S_2O_3$. As an extremely strong reducing agent for analytical work, this chemically pure reagent has numerous applications. Eimer & Amend.

SILVER FLUOBORATE SOLUTION

$AgBF_4$ solution. Typical Analysis: 47.4% $AgBF_4$, 26.2% Ag, 0.7% HBF_4, 3.5% H_3BO_3. A colorless liquid, Sp. Gr. 1.62 at 20°C (13.5 lbs. per gallon), pH 1-2. The concentrate, easily diluted to proper strength and with suitable plating assistants added, produces an electroplating bath which may be used at high current density with quantitative current efficiency. Limited quantities are available. General Chemical Co.

SODIUM AMMONIUM PYROPHOSPHATE

A white, granular, free-flowing solid, very soluble in water and dilute mineral acids. Loses ammonia slowly on exposure to air. Reverts to orthophosphate in water solution, more rapidly at elevated temperatures. pH of 1% solution, 8.0. Approximate composition: $Na_2(NH_4)_2P_2O_7 \cdot 2H_2O$. Suggested use: Flame proofing; water softening. Monsanto Chemical Company.

SODIUM CARBOXYMETHYLCELLULOSE

CMC is a white, granular powder, odorless and tasteless, that forms viscous, stable solutions in water. These solutions deposit colorless, tough, transparent films unaffected by oils, fats, greases and most organic solvents. The films can be rendered insol. in water if desired. Applications: thickening agent in textile print pastes and latex solutions; stabilizing agent in emulsion paints and lacquers; paper sizing and coating, particularly for greaseproof coatings; creaming latex, oil drilling muds, ceramics, can-sealing compounds. Hercules Powder Co.

SODIUM COPPER IRON PYROPHOSPHATE

A green-brown brittle granular solid, insol. in water and mineral acids. Suggested use: As catalyst. Monsanto Chemical Company.

SODIUM CUPRIC PYROPHOSPHATE

$Na_2CuP_2O_7 \times H_2O$. Green to blue powder. Insol. in water; sol. in dilute mineral acids and in sodium pyrophosphate solution. Suggested uses: Catalyst, fungicide and insecticide. Monsanto Chemical Company.

SODIUM TRIFLUOROACETATE

CF_3COONa. Mol. Wt., 112. White cryst. solid. Sol. in water and alcohol. Reacts with sulfuric acid to give trifluoroacetic acid. When treated with sulfuric acid and ethyl alcohol the ethyl ester of trifluoroacetic acid is obtained. Available in limited quantities. Columbia Organic Chemicals Co.

SOLUBLE STARCH

A specially purified grade of soluble starch with all dextrine removed so that a clear cut color change occurs in presence of iodine. There is no possibility of transition of the solution through the reddish purple stage that occurs in the presence of dextrine. This starch is tested in accordance with the specifications in Rosin's "Reagent Chemicals and Standards." Eimer & Amend.

STANNOUS (TIN) FLUOBORATE SOLUTION

$Sn(BF_4)_2$ solution. Typical analysis: 47% $Sn(BF_4)_2$, 19% Sn, 4.0% free HBF_4, 3.0% free H_3BO_3. A colorless liquid, Sp. Gr. 1.60 at 20° C (13.3 lbs. per gallon), pH 1-2. The concentrate, easily diluted to proper strength and with suitable plating assistants added, produces an electroplating bath which will deposit tin at high current density and high current efficiency. Mixed with lead fluoborate and using dual or alloy anodes lead-tin alloy deposits may be obtained containing from 3% tin to any higher percentage desired. Commercial quantities of tin flouborate are immediately available. General Chemical Co.

4-SULFOPHTHALIC ANHYDRIDE (Technical)

$(SO_3H)C_6H_3(CO)_2O$. A reddish-brown non-flowable syrup which may partially crystallize on long standing. Melts to a free flowing liquid around 80°-90°C. Stable but hygroscopic. Soluble in water and alcohol. Strong acid. pH (1% solution), 1.9. Tentative specifications: 4-Sulfophthalic anhydride, 94-97%. Phthalic anhydride, 0.5-4.5%. SO_3 as H_2SO_4, 2-5%. Total acidity, 26-27 ml. N/2 NaOH/gr. Suggested uses: Intermediate in chemical synthesis. Availability: Pilot plant quantities. Monsanto Chemical Company.

TETRA-AMMONIUM PYROPHOSPHATE

A white, granular, hygroscopic, solid, very sol. in water and dilute mineral acid. Loses ammonia slowly on exposure to air. Reverts to orthophosphate in water solution, more rapidly at elevated temperatures. pH of 1% solution, 8.2. Approximate composition: $(NH_4)_4P_2O_7$. Suggested use: Flame proofing. Monsanto Chemical Company.

N-n-TETRADECYLETHYLENEDIAMINE

$H_2NCH_2CH_2NHC_{14}H_{29}$. Mol. Wt. 256. White, waxy solid. M. P. 42-43°. Insoluble in water; soluble in most organic solvents. Dihydrochloride: $C_{16}H_{36}N_2 \cdot 2HCl$. Mol. Wt. 329. Prisms from alcohol. M. P. 198-199° dec. Suggested uses: Detergent, intermediate. Available only in small quantities for experimental investigation. Evans Chemetics, Inc.

THIOPHENOL (Phenyl Mercaptan)

C_6H_5SH. Mol. Wt., 110.17; Sp. Gr., 1.078 at 20°C.; B. Range, 166-169°C at atmospheric pressure. Assay 95% minimum. Colorless to slightly yellow highly refractive oil. Insol. in water, sol. in the common organic solvents. Suggested uses: Flotation agent, termite repellant, promoter for healing of burns; chemical intermediate for synthesis of dyes, insecticides, plasticizers, pharmaceuticals and lubricant addition agents. Small samples available. General Chemical Co.

1,1,1-TRIFLUORO-2,3,3-TRICHLOROPROPENE-2

$CF_3CCl{=}CCl_2$. Mol. Wt., 199.37, B. P., 89°C. at 760 mm. Colorless liquid having sharp, penetrating odor. Used as raw material for preparation of trifluoracetic acid, its esters, and the sodium salt. Available in limited quantities. Columbia Organic Chemicals Co.

TRIMETHYLACETIC ACID (Pivalic acid)

$(CH_3)_3CCOOH$. Mol. Wt. 102.13; M. P. 35.5°C; B. P., 72-75°C/18-20 mm Hg.; Sp. Gr., 1.393 at 36.5°C. Colorless crystals sl. sol. in water, sol. in most common organic solvents. Suggested uses: organic syntheses. General Chemical Co.

UNDECYLENIC ACID

$CH_2{=}CH(CH_2)_8COOH$. Mol. Wt., 184.27; M. P., 20°-21°C.; B. P., 160°C. @ 10 mm.; Sp. Gr. 0.906 20°/15°. Terminal position of the thesis. It is also one of the few available long unsaturation makes it suited for organic synthesis. It is also one of the few available long chain fatty acids containing an *odd* number of carbon atoms. Extensively used in the preparation of zinc undecylenate and other derivatives having fungicidal and insecticidal properties. Available in commercial quantities. Fine Chemicals Div., The Baker Castor Oil Co.

URSOLIC ACID

$C_{29}H_{46}(OH)COOH$. This material has wide applications as a plasticizer for cellulose acetate, cellulose ethers and esters. It is a pure grade reagent. Eimer & Amend.

ZINC FLUOBORATE SOLUTION

$Zn(BF_4)_2$ solution. Typical analysis: 47.5% $Zn(BF_4)_2$, 13% Zn, 0.5% free HBF_4, 4% free H_3BO_3. A colorless liquid, Sp. Gr. 1.55 at 20°C (12.9 lbs. per gallon), pH 1-2. The concentrate, easily diluted to proper strength with or without suitable plating assistants produces an electroplating bath which may be used at high current density with quantitative current efficiency, and at the same time having exceptional simplicity of control. Commercial quantities are available. General Chemical Co.

ZINC UNDECYLENATE

$Zn\ (OOC(CH_2)_8CH{=}CH_2)_2$. Mol. Wt., 431.4. Fluffy, white powdered soap. It has most of the characteristics of metallic soaps, and possesses other valuable properties because of its terminal unsaturation. One such property is its fungicidal power, exemplified by its extensive use in powders and ointments for the prevention and cure of "athlete's foot." Available in experimental quantities. Fine Chemicals Div., The Baker Castor Oil Co.

New Chemical Specialties

E. & A. AMERICAN ASBESTOS

This washed and ignited asbestos is made from domestic fibers for Gooch filtering. It is thoroughly washed and ignited to remove alkali and chloride. Any break down that can occur is accomplished during this ignition and any of the material that has a tendency to crumble is removed. Thus the user is assured that no further breakdowns will occur. This grade is especially for such precipitations as barium sulfate where high drying temperature is necessary, or for iron oxide where the precipitate is ignited. Eimer & Amend.

AROCHEM 522

Acid Number, 25-35; M. P. (Mercury Method), 140-150°C.; Color (G. H. 1933 50% in Toluol), 8-10; Sp. Gr., 1.1; Solubility, Complete in coal-tar solvents, lacquer solvents and the usual varnish oils. Complete in petroleum solvent except in low solids solutions. Insol. in ethyl alcohol but its solutions will tolerate the addition of considerable amounts. A high melting point, modified maleic type resin. It possesses pale color, excellent color retention, rapid solvent release and solubility in petroleum solvents (solutions of approximately 40% non-volatile and higher). U. S. Industrial Chemicals, Inc.

AROCHEM 603

Acid Number, 25-35; M. P. (Mercury Method), 130-140°C.; Color (G. H. 1933-50% cut in Toluol), 9-11; Viscosity (G. H.-60% cut in Toluol), B-E; Sp. Gr., 1.1; Solubility: Complete in petroleum hydrocarbons and coal-tar hydrocarbons and the usual varnish oils. Insol. in alcohol. One of the newer types of modified and fortified synthetic resins. This product can be used with all types of drying oils in the manufacture of varnishes and will be found to give superior performance with "soft" oils than is obtainable with other modified resins of equivalent melting point. U. S. Industrial Chemicals, Inc.

AROCHEM 607

Acid Number, 25-35; M. P. (Mercury Method), 155-165°C.; Color (G. H. 1933-50% cut in Toluol), 9-11; Viscosity (G. H.-60% cut in Toluol), R-U; Sp. Gr., 1.1; Solubility: Complete in petroleum and coal-tar hydrocarbons and the usual varnish oils. Insol. in ethyl alcohol. One of the newer type, synthetic, modified resins produced specifically for use with "soft oils." It is a very high melting point resin, its varnishes possessing all the advantages imparted by resins of this type. In addition, Arochem 607 varnishes display greater toughness of film which property is attributed to the resin's exceptionally large molecular structure; also greater ease of processing due to the fact that the solubility of this resin in oils is much greater than conventional resins of comparable melting points. U. S. Industrial Chemicals, Inc.

AROPLAZ 1311

Solution, 59-61% solids in High Solvency Naphtha; Viscosity (G. H.), S-V; Acid Number (solvent free basis), 25-30; Color (G. H. 1933), 8-10; Weight per gallon @ 25°C., 8.15-8.25 lbs.; Oil Content (solvent free basis), 50%; Phthalic Anhydride Content (solvent free basis), none; Solubility: Complete in coal-tar and petroleum solvents; also in usual lacquer solvents. Compatible with most urea, melamine and nitrocellulose. A non-phthalic, modified, semi-drying, alkyd type resin. It is particularly well suited for use in urea or melamine finishes to which it imparts flexibility, toughness and gloss. High resistance to abrasion is also maintained in finishes of this type, and the paleness and color retentive properties of Aroplaz 1311 permits the production of clean, white baking enamels. U. S. Industrial Chemicals, Inc.

AROPLAZ 1350

100% Non-volatile; Viscosity (G. H.), X-Y; Color (G. H. 1933), 2-4; Acid Value, 10-18; Weight per gallon @ 25°C., 8.6-8.7 lbs.; Oil Content, 65%; Phthalic Anhydride Content, 10%; Solubility, Complete in coaltar hydrocarbons and lacquer solvents. Limited solubility in petroleum solvents. Compatible with nitrocellulose, ethyl cellulose, melamine and urea resins. A pure, long oil, non-oxidizing type alkyd resin plasticizer. It is a liquid resin, supplied at 100% solids and is prepared especially for use in the formulation of lacquers possessing exceptionally good flexibility and adhesion. Because of this property, Aroplaz 1350 finds wide usage in textile, leather and paper coatings as well as in wood and metal lacquers. U. S. Industrial Chemicals, Inc.

S&W AROPLAZ 1379

Solution, 49-51% solids in Mineral Spirits; Viscosity (GH), X-Z; Color (GH 1933), 10-12; Acid Value (solvent free basis), 10-15 Wgt/Gal. @ 25° C., 7.7-7.8 lbs.; Oil Content, No reportable oil; Phthalic Anhydride (solvent free basis), 33%; Solubility, Complete in all petroleum and coaltar hydrocarbons. Insol. in ethyl alcohol. Compatible with many alkyds, varnishes and drying oils of low and medium viscosity. An oxidizing, hard, resin-modified, medium-to-short oil length alkyd resin, prepared from raw materials that are exempt from the existing oil and rosin quotas. This fact makes this resin of particular interest and value to the protective coating manufacturer at the present time. In addition, S&W Aroplaz 1379 is a very low cost vehicle. U. S. Industrial Chemicals, Inc.

AROPLAZ 1385

Solution, 49-51% solids in VM&P Naphtha; Viscosity (G. H.), Z-Z2; Acid Number (solvent free basis), 6-10; Color (G. H. 1933), 10-12; Weight per gallon @ 25°C., 7.5-7.6 lbs.; Oil content (solvent free basis), 29%; Phthalic Anhydride Content (solvent free basis), 29%; Solubility? Completely sol. in coal-tar hydrocarbons and sol. in petroleum hydrocarbons in all practical proportions. Insol. in ethyl alcohol. Compatible with low viscosity oils and varnishes as well as with medium and long oil alkyds. A hard resin modified, short oil, oxidizing alkyd resin recommended for use in spraying and dipping type primers and finish coats. It is extremely fast in its setting and drying properties and, therefore, is highly suited for use in various production finishes where fast air-drying or very short, low baking is of prime importance and exterior durability, color retention, etc. are secondary. U. S. Industrial Chemicals, Inc.

CAROXITE

This chemical specialty is particularly suited to the removal of CO_2 in combustion trains or wherever the gas is to be eliminated as an impurity. It is from 25 to 40% more efficient than previous absorbents of this type and has the particular advantage of indicating when it is spent. When packed in an absorption bulb, the material changes from a purple-tan color to a deep red and finally to white as carbon dioxide is absorbed. Thus the user can tell when the absorption bulb must be replaced. Eimer and Amend.

CASTORWAX

Mol. Wt. 932, M. P. 86°-87°C. Hard, white wax which is a hydrogenated castor oil with an iodine value of less than 5.0. Commercial Uses: Lubricant, anti-blocking agent, mold release agent for rubbers and plastics. Available in commercial quantities. Fine Chemicals Div., The Baker Castor Oil Co.

DRESINATE 731

A sodium soap of a modified resin derived from rosin. It is used commercially in the manufacture of the new and improved type of

(Continued on page 316)

Washington

(*Continued from page 184*)

Carnauba Wax Price Action Looms

BEFORE THIS APPEARS, it would not cause surprise if the Office of Price Administration has restored price ceilings on imports of Brazilian carnauba wax, as well as other such waxes.

Early in the Fall of 1945, due to the improved situation, and to meet sentiment in the trade, price ceilings were removed. The result since has been the cause of considerable dissatisfaction among consuming interests and others.

Some of these are known to have asked Washington authorities to consider some further action looking to a more normal market in carnauba wax, and the response here has been to revive the possibility of price regulation.

Surpluses in Italy Being Sold

OFFICIALS CONCERNED WITH liquidation of surplus petroleum stocks overseas, as well as other products, have consulted with interested private companies here to learn what these organizations might wish to do in pending surplus disposal plans. They were advised that while they may not import into the United States any government-owned surplus stocks bought abroad under these conditions, they might take advantage of the presence of these goods abroad, in other ways.

National Plastics Exposition To Be Held In New York

The present status of all the plastics and their possibilities for future application in all types of industries will be presented graphically in the first National Plastics Exposition, to be held in Grand Central Palace, New York City, April 22 to 27, 1946, it is announced by the Society of the Plastics Industry, 295 Madison Avenue, New York 17, N. Y.

The Exposition, first ever held on a national basis in the country's newest major industry, will bring together for the first time in one place and at one time the industry's leading manufacturers of raw materials and machinery, as well as plastics fabricators. Some 200 companies will participate in the Exposition, with attendance to be drawn not only from all parts of the United States, but also Canada, Latin America and Europe.

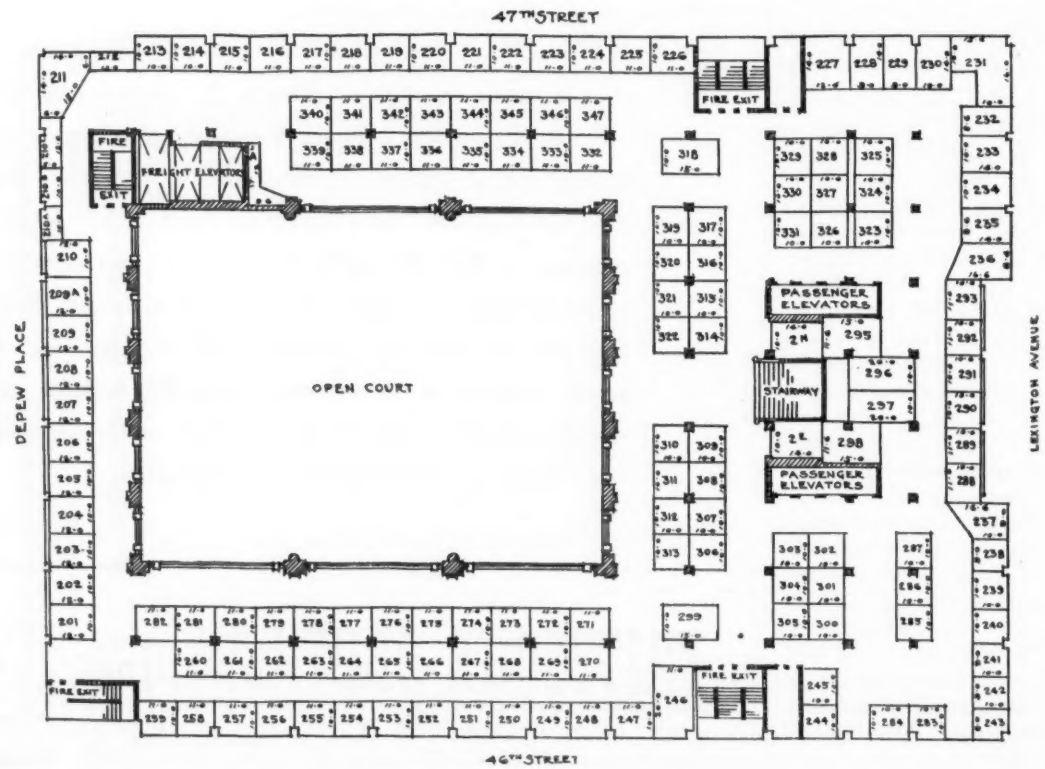
Concurrently with the Exposition, the Society of the Plastics Industry will hold a convention at which leading authorities will discuss the latest advances in plastics technology and application. Meetings will be open to the public.

Floor Plan, Exposition of Chemical Industries

Grand Central Palace, New York, N. Y., February 25 to March 2, 1946

MAIN FLOOR

SECOND FLOOR



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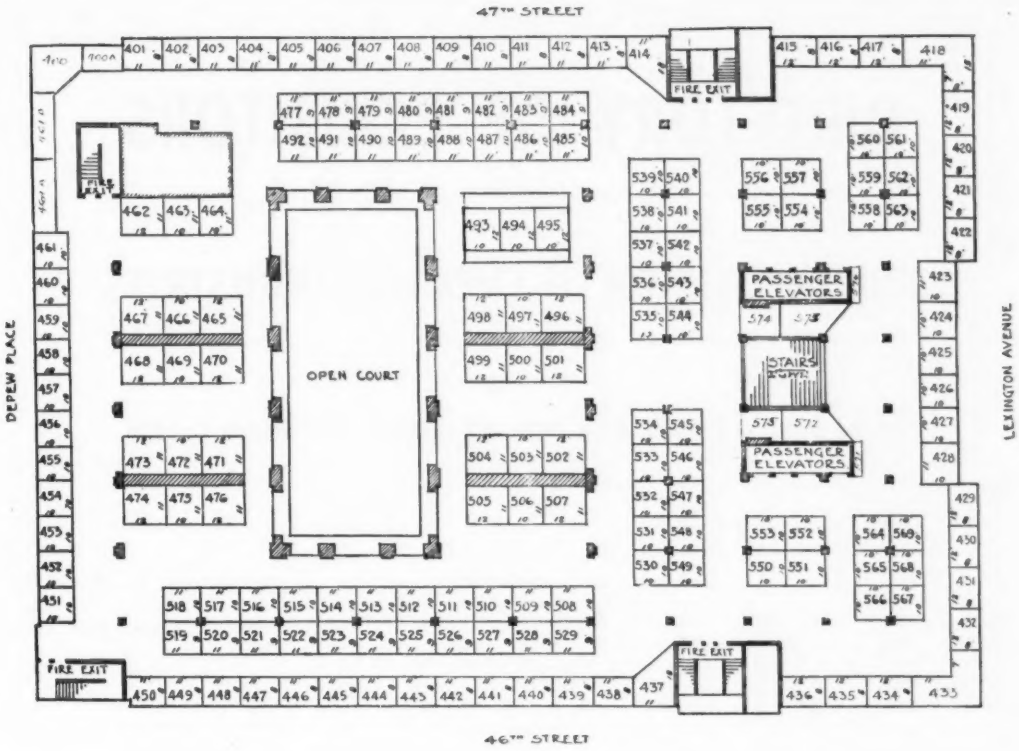
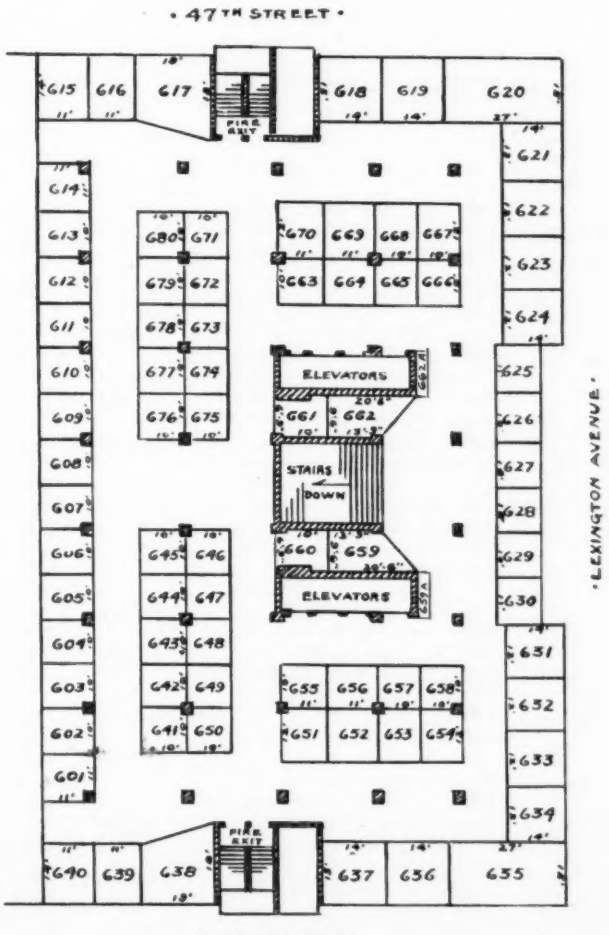


FOURTH FLOOR



DIRECTORY OF EXHIBITORS

20th EXPOSITION OF CHEMICAL INDUSTRIES

Grand Central Palace, New York—February 25—March 2, 1946

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BETWEEN THE LINES

Natural Gas: To Use or To Hold

The possibility of disposal of now-surplus Big Inch and Little Inch to gas interests for transporting natural gas raises a basic issue of Federal regulation of natural gas distribution. A recent FPC decision indicates that presence of competing fuels may be a determining factor in deciding what areas will get natural gas service.

THE year-end found Congress still contemplating ways of disposal by the Government of its two now-surplus "Inch" pipelines—Big and Little—and with a rather unexpected possibility looming as the outcome.

There were definite indications that Senator O'Mahoney's committee, which has been conducting hearings in this and the related natural gas investigation, may recommend that both of the pipelines be used for transportation of natural gas, instead of the petroleum for which they were built. As is now generally known, ocean tankers, freed from war service, are again coming into the situation as it involves petroleum transport.

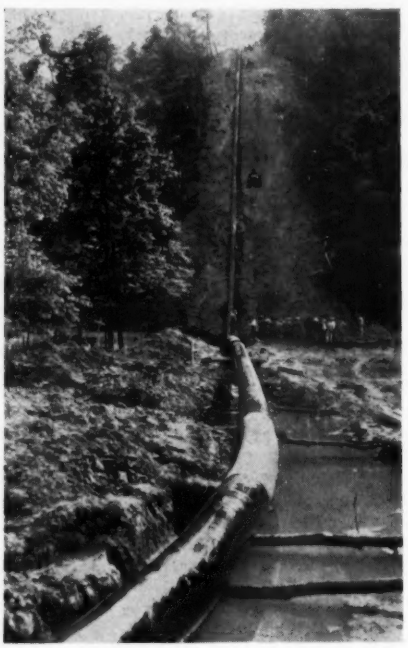
Senator O'Mahoney is represented as being very favorable to the idea of disposing of these pipelines to the natural gas industry, if satisfactory financial arrangements are made. Whereas the oil tankers are back in their routes, and looking for business, the Senate Committee of which Senator O'Mahoney is chairman, is understood to have been impressed with testimony that natural gas reserves are available sufficient to keep the lines in economically stable operation.

This testimony came from an obviously authoritative source, James E. Pew, director of the Natural Gas Division of the now inactive Petroleum Administration for War.* He estimated for the committee that reserves in question could provide a full load for the "Big Inch" for the next 20 years.

Basic Issue Shaping

The possibility here outlined leads into some background situations, however, which have not been developed publicly in much detail. There has been in progress for some months a field investigation by the Federal Power Commission. Three further hearings are scheduled for February 11, in Biloxi, Miss., February 19, Chicago, and March 19, at Charleston, W. Va. Meanwhile, at the close of hearings in late November at New Orleans, an underlying situation was brought into the open. It suggests that there is shaping a basic issue of conservation versus utilization of natural gas, which has significant implications for using industries other than immediate producing areas.

At the New Orleans hearings Louisiana officials are reported to have asked outright Federal regulation to restrict the export of natural gas from their state for large-scale consumption in other states that normally have available other sources of fuel. As a matter of fact, the Federal Power Commission in a decision a short time previously, did actually withhold a certificate that would have authorized a large natural gas company to construct a pipeline intended to supply a utility company in Iowa with natural gas.



Big Inch has started a controversy.

As a side comment, this action is an apparent contradiction of the Federal Power Commission's statement in its report on the Natural Gas Act, in early 1944, that it lacked authority under that Act either to regulate the "end use" of natural gas, or to deny gas companies the right to transport gas to other markets where it might compete with other fuels. In this particular case the FPC based its position on the possibility that the natural gas, if allowed to be piped into the Iowa community in question, would displace an estimated 30,000 tons of coal annually, which, the Commission argued, it had been shown could be used successfully for the purpose involved.

If the Commission follows this line consistently, it obviously will affect some chemical and allied industries equipped for utilizing natural gas as fuel, or contemplating such use.

In fact, while this article was being written, the Commission flatly asserted broad authority over gas pipeline construction in a letter to all natural gas companies recalling the Commission's existing powers and calling attention of the companies to necessity of securing FPC authorization as a preliminary to constructing new pipe lines. In this position the Commission is bolstered by a Supreme Court decision which in effect sustained a lower court's opinion favorable to the Commission in a case in Louisiana.

The Commission's letter is merely a restatement of the authority it claims under certain sections of the Natural Gas Act. However, in deciding whether or not a natural gas company, or a similar concern engaged in piping natural gas to other sections of the country, should be entitled to build new lines, it is obvious that the Commission could give weight to the new principle it is developing. At any rate, it apparently now believes it has such authority, in spite of what it advised Congress in a previous statement.

Gas Has Broad Backing

For instance, oil and gas interests have manifested some concern over the prospect at one time that the Government might seek to retain the two big pipelines and operate them. This may have stimulated the interest of natural gas in demonstrating the possibility of transporting gas in the lines, but private industry was not alone in advancing the idea. It has attracted some interest that certain State utility bodies, including the New York State Power Authority, are reported to have looked into the idea of acquiring these pipelines to move natural gas from southern producing areas to eastern and northern consumers.

If the presence of competitive fuels is a dominant factor in whether or not to authorize a pipeline that would supply natural gas also, it obviously complicates the situation for the natural gas industry contemplating whether to buy or lease the lines or keep out.

There is ground for believing that the Federal Power Commission, even though it has tentatively advanced such a principle, is really seeking to develop more

* Arrangements are being completed to transfer from the Petroleum Administration to the Bureau of Mines, the responsibility for disseminating to the proper industries all the technical data and other information obtained by the technical oil mission that investigated the German synthetic and petroleum industries that operated in the war.

information on the matter as a fundamental purpose of its current field hearings. All of which leads back to the present Congressional situation in the matter.

The Federal Communications Commission is expected to furnish Congress with its comments on its findings in these hearings. Meantime, eyeing the suggestion that the pipelines might appeal to the natural gas industry under favorable circumstances, Congressional action that would eliminate Federal control over natural gas carried in the Big and Little Inch has been urged in some quarters.

This could be accomplished in a revision of the Natural Gas Act, which would establish some form of State cooperation in the regulation of natural gas moving through pipelines interstate. A specific suggestion to this effect was advanced before the O'Mahoney committee. This idea, however, is subject to diverse influences in Congress. There is a known sympathy among some members to the proposal that gas companies be allowed to take over the lines, and there is also a so-called "public ownership" element in Congress that naturally would not approve such a plan.

Undoubtedly, the desire to see Congress write in some definite brake on Federal authority in this situation is influenced in part by the intimation in the pipeline case cited, that Federal Power Commission would give weight to intervention by some competing fuel industry, as in the case of coal. Both coal and oil are multi-state industries, regional in scope and national in weight. The gas interests tend to object to such intervention, as by coal, on the ground that the gas industry is regulated, closely, Federally and by State authority, already; and coal, for instance, is not so handicapped, if it can be termed that.

The Federal Power Commission has, in fact, intimated very broadly that its intentions in the current investigation are "friendly," so to speak.

"The Commission has pointed out many times that in this investigation it has no preconceived ends which it wishes to attain," the commissioner in charge of the investigation stated recently. "The Commission wishes to hear fully from anyone who has any interest in the problems arising out of interstate transportation and sale of natural gas and the administration of the Natural Gas Act. In these problems the consumers have a large interest and stake. It is the Commission's hope that a full presentation from the consumer viewpoint will be made at these hearings."

As a collateral reference the current situation in tankers may be pertinent. There was some Government interest at one time in seeing the private oil industry utilize the Government's two big pipelines. As a result of the war, however, the United States today has a tanker fleet, public and private, far exceeding any current domestic demands for commercial use. In fact, the American-flag tankers, added to the world tanker fleet, have augmented the numbers of this class of vessel greatly beyond its prewar status.

Therefore, the trend is seen of a return by petroleum shippers to the tanker, rather than the cross-continent pipeline, for moving the product into industry.

At the close of the war oil companies owned 82 percent of American-flag tankers in operation, and the remaining 18 percent were owned by other users not in the oil business. An oil company then, contemplating acquisition or lease of a major Federally-owned pipeline, would probably have to weigh the advantages against a resumption on normal scale of shipments in its own vessels. This may explain, in part, why the interests in the Government's pipelines apparently shifted to natural gas shippers after a time, and why, with the oil companies in this position, there is some disposition to favor assisting a gas industry if it can arrange to use the pipelines.

On the other hand, and still a big part of the outlook, there has been nothing final in this matter. Oil industry operation of the lines is not ruled out, and judging by the developing conditions revealed in disposal of other bulk Government surplus property in industry, neither is large-scale aid to any industry acquiring such an over-size item as the pipelines, ruled out.

The Surplus Property Administration, in fact, filed its report to Congress while this was in preparation, and on the score of the pipeline controversy, stated:

"The economic possibility of converting either or both of the Big Inch lines to the transportation of natural gas has been rather thoroughly explored. Some petroleum operators advocate such use, and widespread interest has been shown by other groups.

"It has been pointed out that the lines originate in the part of the United States with some of the most prolific production of natural gas and the greatest proven reserves, that they terminate in the most densely populated and most heavily industrialized area in the country.

"It has also been emphasized that the lines traverse many areas not now served by natural gas, and that they would, in effect, put to good economic use a resource which is now subject to a great amount of waste, because of the lack of facilities to transport it to heavy consuming areas."

Recalling that at least two studies have been made on conversion of the lines to gas, and that both conclude that such use would be economically feasible, the SPA nevertheless concluded:

"However, since the lines were not designed for gas, their value for this purpose would be much less than if they were used for transportation of oil . . ." and, said the Administrator, "their disposal for this purpose can be considered only if the national security (in oil) is otherwise adequately protected."

A GREAT ACTOR TAKING MANY LEADS in the INDUSTRIAL THEATRE

KELCO ALGIN

KELCO ALGIN'S fame has spread from one important industry to another, but KELCO ALGIN does not thrust itself into the limelight. Instead, KELCO ALGIN stands back of many products and lets them take all the bows.

KELCO ALGIN is an important ingredient — giving smoother effectiveness of imparting better appearance — to such widely different products as: TEXTILE PRINTING PASTES . . . LATEX ADHESIVE MIXTURES . . . PAPER SIZINGS . . . BOILER WATER COMPOUNDS . . . COLD WATER PAINTS . . . INDUSTRIAL HAND LOTIONS . . . TOOTH PASTES AND OTHER PHARMACEUTICALS . . . FOOD PRODUCTS.

This super-refined natural product is adaptable to all situations which require a thickening, suspending, stabilizing, emulsifying, gel-producing or film-forming agent. Due to the precise standards to which KELCO ALGIN is manufactured, it never varies from the exact specifications laid down by your formula.

Our technical staff is prepared to work in closest cooperation with you in regard to your considered application of KELCO ALGIN. Write or wire us for immediate consultation.

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31 Nassau Street
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530 W. Sixth Street
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BOOKLETS & CATALOGS

Chemicals

A887. CELLULOSE FINISHES. "New Developments in Permanent Cellulose Finishes" is the title of a 4-page booklet of the Dexter Chemical Corp.

A888. COMPRESSED GASES. Price list. The Matheson Co.

A889. MOLDING MATERIALS. The molding materials available from the Chemaco Corp. are described in a recent 20-page book.

A890. PLASTICS. Authentic information about plastics is contained in a 36-page booklet which is available from the committee on plastics education of the Society of the Plastics Industry, Inc.

A891. PLASTICS. "Everyday Plastics" titles a new consumer guide which is available from Modern Plastics.

A892. PLASTICS. The mode of treatment of plastics problems submitted to the Monsanto Chemical Co. is described in an 8-page booklet.

A893. RESINS. The Textile Resins Department of American Cyanamid Co. has announced the release of textile finishing bulletin No. 108, titled "Aerotex Resin 7513."

A894. SILICONES. DC mold release fluid and DC 7 compound for use in securing release of rubber or plastic materials from injection or compression molds are described in an 8-page booklet issued by the Dow-Corning Corp.

Equipment—Methods

F567. BUSINESS ENGINEERING. "20 Years of Trouble" titles a recent 24-page book which is available from George S. May Co.

F568. CHROMATE CORROSION INHIBITION in bimetallic systems is the subject of a 12-page booklet offered by the Mutual Chemical Co. of America.

F569. CONSULTING LABORATORIES. The background and function of Arthur D. Little, Inc., as a consulting laboratory for industrial research is described and pictured in a recent 20-page brochure.

F570. ELECTRICAL INSTRUMENTS. A 28-page book of the Marion Electrical Co. illustrates and describes the Marion line of standard and hermetically sealed electrical indicating instruments.

F571. ELASTOMER PRODUCTS. The B. F. Goodrich Co. has made a new 12-page booklet on rubber and synthetic products available to suggest application of these products for industrial designing.

F572. ELECTRIC MOTORS. The Crocker-Wheeler ivision of the Joshua Hendy Iron Works has published a 4-page bulletin describing the company's sealed-power motors.

F573. EQUIPMENT. A recent 15-page booklet of Youngstown Welding and Engineering Co. gives a picture of the equipment designed and fabricated by that organization.

F574. FOAMGLAS. The Pittsburgh Corning Corp. has a 24-page book available describing the use of Foamglas as a heat insulating material.

F575. GASOLINE REFINING. The economics of post-war motor gasoline refining is the subject of a detailed data file, which is available from the M. W. Kellogg Co.

F576. HASTELLOY. "Hastelloy Facing for Corrosion Resistance" titles a 4-page folder which is available from Haynes Stellite Co.

F577. HEATING CONTROLLER. The Bristol Co. has announced the availability of a bulletin (No. PB 1223) describing a method of adaptation of their Pyromaster Microact Controllers to the two stage firing of gas furnaces.

F578. HOSE FITTING. A new 4-page catalog section on their line of hose fittings has just been published by the B. F. Goodrich Co.

F579. INDUSTRIAL CLEANING. "Chemistry in Aircraft Maintenance" titles a 28-page booklet, illustrated in color, available from Turco Products, Inc.

F580. INSULATION MATERIALS. William Brand & Co. has issued a new 32-page manual describing and cataloging the various insulation materials which they have available.

F581. LABORATORY AUTOCLAVE. Details of a new tilting-type laboratory stirring autoclave are contained in a bulletin (No. 16-2136), which is available from the American Instrument Co.

F582. LAMPS. "The Incandescent Lamp," giving the forms in which it is available and factors influencing good lighting, is available in the form of a 24-page booklet of the Westinghouse Electric Corp.

F583. LIFT TRUCKS. Data on lift truck and lift truck accessories is available in the product data file from the Towmotor Corp.

F584. LIFT TRUCK. The Red Giant Model G lift truck is described and pictured in a 4-page folder available from Revolvator Co.

F585. LIQUID CONTROL EQUIPMENT. "Steam and Liquid Control Equipment" titles a 40-page catalog (No. 45) of the O. C. Keckley Co.

F586. NEEDLE VALVES. Stainless steel micro-regulating needle valves are the subject of a bulletin (No. 19) available from Bert Borders and Co.

CHEMICAL INDUSTRIES TECHNICAL DATA SERVICE

Chemical Industries, 522 Fifth Ave., New York 18, N. Y. (2-6)

I would like to receive the following free booklets and catalogues.

A887	F567	F575	F583	F591	F599
A888	F568	F576	F584	F592	F600
A889	F569	F577	F585	F593	F601
A890	F570	F578	F586	F594	F602
A891	F571	F579	F587	F595	F603
A892	F572	F580	F588	F596	F604
A893	F573	F581	F589	F597	F605
A894	F574	F582	F590	F598	F606
					F607

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Street .....

City ..... Zone ..... State .....

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The advantages which the versatile reagent Phosgene affords in organic synthesis are now available through this new service at the Columbia plant, Barberton, Ohio.

PHOSGENATION FOR ORGANIC DERIVATIVES INCLUDING CHLOROFORMATES AND CARBONATES

The facilities, experience and skills acquired in the manufacture and tonnage handling of gaseous Phosgene in organic synthesis enable Columbia to conduct chemical reactions using Phosgene for the production of a wide variety of useful materials.

CONSULTATION INVITED

You are invited to discuss Phosgenation relating to your specific needs with our Technical Staff. Arrangements can be made by writing to the address shown below.

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Soda Ash • Caustic Soda • Sodium Bicarbonate • Liquid Chlorine • Silene EF (Hydrated Calcium Silicate) • Calcium Chloride • Soda Briquettes
Modified Sodas • Caustic Ash • Phosflake • Calcene T (Precipitated Calcium Carbonate) • Pittchlor (Calcium Hypochlorite)

F587. OSCILLOGRAPH. The type 208-B cathode ray oscillograph of Allen B. DuMont Laboratories is described and pictured in a new series of leaflets and folders.

F588. OSCILLOGRAPH. The Type 248 cathode ray oscillograph of Allen B. DuMont Laboratories, Inc., is described in a recent folder.

F589. PALLETS and their use is the subject of a new booklet recently announced by the General Box Co.

F590. PLASTIC MOLDING. "Forming Articles from Extruded Tenite Sheeting" titles a new 12-page bulletin of the Tennessee Eastman Corp.

F591. PRESSURE REDUCING REGULATOR. Full details concerning the new small pressure reducing regulator of the Grove Regulator Co. are contained in a recent bulletin (No. 940).

F592. PUMPS. Many typical applications of the vertical turbine pumps of the Worthington Pump and Machinery Co. are described in a recent 12-page bulletin (No. H-450-B33).

F593. PUMPS. Eco Engineering Co. has issued an illustrated instruction sheet describing the installation and operation of Eco gearless pumps.

F594. PUMP. The "Marlow Mud Hog" diaphragm pump is described in a 12-page bulletin available from Marlow Pump.

F595. PUMPS. The Oliver diaphragm slurry pump is described in a recent bulletin (No. 309) of Oliver United Filters, Inc.

F596. REFRIGERATION. Centrifugal refrigeration is the subject of a recent 24-page catalog (No. C100-B14) that has been made available by the Worthington Pump and Machinery Co.

F597. RELIEF VALVES. A new catalog (No. 45) of the Farris Engineering Co. describes their line of safety and relief valves.

F598. SAFETY. "Grime Does Not Pay" titles a 4-page folder, emphasizing the desirability of good housekeeping in the plant, which is available from the B. F. Goodrich Co.

F599. SCALE PREVENTION. The prevention of scale in cooling water systems by chemical means is the subject of a 13-page paper (No. 102) which is available from W. H. and L. D. Betz.

F600. SPRING HANGER. "Blaw-Knox Functional Spring Hangers and Vibration Eliminators" titles a 36-page catalog (No. 2026) recently issued by Blaw-Knox Co.

F601. THERMOCOUPLES. A new edition of the thermocouple data book (S2-6) has been issued by the Wheelco Instrument Co.

F602. TUBING FITTINGS. Flexigrip tubing fittings are described and pictured in a 4-page folder which is available from the Gustin-Bacon Manufacturing Co.

F603. TUBE FURNACES. "Unit Package" tube furnaces and McDaniel combustion tubes are described in a 6-page bulletin of the Burrell Technical Supply Co.

F604. VACUUM PUMPS. "Kinney High Vacuum Pumps" titles a 24-page booklet (No. V-45), which is available from the Kinney Mfg. Co.

F605. VALVES. The latest development in lever-operated gate valves are noted in a new 16-page bulletin (No. #-150), which is available from the Everlasting Valve Co.

F606. WIRE ROPE CLAMP. The new Cabl-Ox wire rope clamp of Nunn Manufacturing Co. is described in a recent folder.

F607. X-RAY EQUIPMENT. "Norelco Industrial X-Ray Equipment" titles a new 12-page booklet that has been announced by the North American Philips Co., Inc.

NEW PRODUCTS & PROCESSES

Nitrogen Compounds NP 244

A program for large-scale semi-works production of new organic derivatives is under way in the Explosives Department of E. I. du Pont de Nemours & Co., Inc.

The compounds include the new cyclohexane derivatives—epsilon-caprolactam, cyclohexanone oxime, and nitrocyclohexane.

Du Pont said the lactam and the oxime can be supplied in quantities ranging from pound lots for laboratory and semi-commercial scale work to ton lots for industrial applications for use in textile processing, the pharmaceutical industry, or in the manufacture of corrosion inhibitors, insecticides, etc.

Pound samples of nitrocyclohexane are available for experimental use in the manufacture of rubber chemicals, resins, solvents, dyes, pharmaceuticals, lacquers, and emulsions. Among its possibilities is use as an industrial solvent in the dewaxing of lubricants and the extractive distillation of petroleum, the company said.

Finely Divided Wax For Rubber NP 245

Anti-tack and anti-block characteristics are readily obtained in many plastics and elastomers which are normally tacky or which have tendencies toward blocking. The incorporation of small percentages of a high melting synthetic wax, Acrawax C, gives excellent results in this regard.

In addition to solid and granule form, Acrawax C is now available powdered (approximately 100 mesh); and as atomized, in which the particle size averages 3 microns. In these finely divided forms, greater ease of processing and incorporation into the blend is obtained.

Baking Enamel NP 246

A high-grade baking enamel, unusually fast drying and almost indestructible, has been developed by the H. V. Walker Company.

Called "Porciflex", this new paint,

when applied to metal, gives a flexible porcelain-like finish which has a high resistance of acids, alkalis, oils, and greases.

Previous materials were baked at temperatures ranging from 275 to 300 degrees for one half to one hour. Applied by spray, roller-coating machine, or dip, Porciflex is baked at schedules from one minute at 450 degrees for sheet steel to 15 minutes at 275 degrees for other types of work.

DDT Concentrate NP 247

A new DDT concentrate, known as Pestroy, designed to provide farmers, stores, hotels, factories, public carriers, restaurants, hospitals, cities and other commercial users with an economical, safe and easy-to-use insecticide with high residual value has been developed by The Sherwin-Williams Company for immediate distribution through hardware stores, restaurant and institution supply houses, exterminators, dairy and feed suppliers and other commercial outlets.

Pestroy, a 25% DDT concentrate, is diluted with water to make a powerful repellent and insecticide which can be sprayed or brushed on any type of surface to destroy flies, mosquitoes, moths, gnats, fleas, roaches, bedbugs, silverfish, wasps, crickets, ants and other common insect pests. A one-gallon can of Pestroy, diluted with four gallons of water to make a 5% solution of insecticide, will effectively cover 4800 square feet of surface. On interior surfaces, the residual deposit left by Pestroy will remain effective for from two to three months. A 5% solution of Pestroy will protect outside surfaces such as screens and doorways for from two to three weeks under average weather conditions.

Emulsifying Agent NP 248

DDT emulsions are readily prepared through the use of a new liquid non-ionic emulsifier, nonaethylene glycol mono oleate S725.

The amount of DDT required to give the desired concentration is dissolved in a suitable amount of a solvent such as xylol, etc., and about 10% of the liquid S725 is added to the DDT solvent solution, with which it is readily miscible. This DDT solvent concentrate is then added to the desired amount of water when and as needed, whereupon it forms excellent emulsions with little or no agitation.

Nonaethhylene glycol mono oleate S725 is readily available in commercial quantities from the manufacturer, Glyco Products Co., Inc. Samples may be obtained upon request.

New $AlCl_3$ Catalysts NP 249

Because of the increase in demand for special type peroleum products, experiments were carried out at Shell Development Company to isomerize straight chain petroleum products to branched chain compounds.

Anhydrous aluminum chloride was known to possess considerable catalytic activity for hydrocarbon isomerization at low temperatures, but the problem was to translate this reaction into a commercially feasible process. If the chemical reaction was to be carried out in a gaseous state, the catalyst, aluminum chloride, vaporized and solidified in other portions of the apparatus were it blocked flow. If the reaction was carried out in a liquid state, the solubility of the catalyst was not great enough. One solution to these problems was the development by

the Shell Companies of a vapor-phase process for butane isomerization, using aluminum chloride impregnated on a bauxite carrier.

The process was immediately put into widespread commercial application but experimental work was continued on the liquid process, and soon this, too, was brought to a successful conclusion. The best catalyst for the new process was aluminum chloride dissolved in antimony chloride together with hydrogen chloride. The new process is said to have a constant high conversion with attendant low catalyst consumption. At the present time a number of commercial plants are in successful operation manufacturing both of these materials.

Antimalarial NP 250

A new antimalarial drug named metachloridine, believed to be more effective than either quinine or atabrine, is now undergoing field tests, according to a report by Dr. E. H. Northey, administrative director of the Stamford, Conn., laboratories of the American Cyanamid Company.

Metachloridine, developed as a result of wartime research, is one of several new synthetic drugs which appear to affect bacteria in a different manner from the common sulfa drugs and operate by an unknown mechanism which is entirely independent of para-aminobenzoic acid.

Metachloridine is chemically 2-metanilamido-5-chloropyrimidine.

Compounds Eliminate Weld Spatter NP 251

Two new weld-spatter-resistant compounds, No. 9951 and No. 9952, have been announced by the Electric Welding Division of the General Electric Company. Both of the new compounds are specially formulated for use in the welding field wherever weld spatter is undesirable and must be avoided easily and economically.

Available from distributors, the compounds are easily mixed and applied. Water is added slowly until a thin paste is obtained. No lumping occurs, and the mixture can be applied with an ordinary bristle brush.

Anodizing Process For Magnesium Alloys NP 252

Manodyz is an electrolytic process, offered by the Hanson-Van Winkle-Munning Company, which produces a protective and decorative magnesium-oxide-silicate film on magnesium alloys. The function of the coating is similar to the aluminum oxide film on anodized aluminum alloys.

Either an alternating current or a direct current which will deliver 4 volts to the Manodyz tank is used. The DC process requires a current density of 10-20 amps.

per sq. ft., while the AC process requires 20-30 amps. per sq. ft. Under normal operating conditions, parts may be completely processed in thirty minutes.

The AC process is preferred with narrow gauge wrought alloys (under .064"), while the DC process may be used with heavier gauge wrought alloys and is preferred for castings and intricate shapes.

Alkyd Resin for White Enamels NP 253

Architectural white alkyd enamels which exhibit outstanding color and gloss retention, combined with materially improved brushing qualities, are said to be possible through the development of a new alkyd resin, Duraplex D-65.

This new phthalic alkyd possesses inherent gloss, and hence requires no added resins or varnishes with consequent darkening of color. Among other features of Duraplex D-65 are its excellent pigment stability and desirable drying properties. In addition, preliminary studies on Duraplex D-65 indicate durability exceeding that of corresponding type alkyds having similar oil length and conventional formulation.

The physical constants of Duraplex D-65 are as follows:

Solids 70%
Acid Number .....8 Maximum
Gravity 0.96
Viscosity .....C-F (50% in M. T.)
Color (ash) 5-8

Recommended formulations and technical notes are available upon request.

Sterilizer Compound NP 254

Specially developed to sterilize surgical instruments cold for the armed forces during the war, a new odorless sterilizer and disinfectant wetting agent has been adapted and is now available for commercial use under the trade name "Timsol" for restaurants, bars, dairies, hotels, hospitals, bottling and food processing plants and wide sanitary uses in public and private buildings and institutions. The active ingredients of Timsol concentrate are quaternary ammonium compounds.

In the recommended solution — one ounce of Timsol to five gallons of water —the customary chlorine disadvantages of skin irritation and odor are absent.

The phenol coefficient of Timsol is 22½ to 25 against *E. Typhi* and 45 to 50 against *Staph. Aureus.*

Insecticide Concentrate NP 255

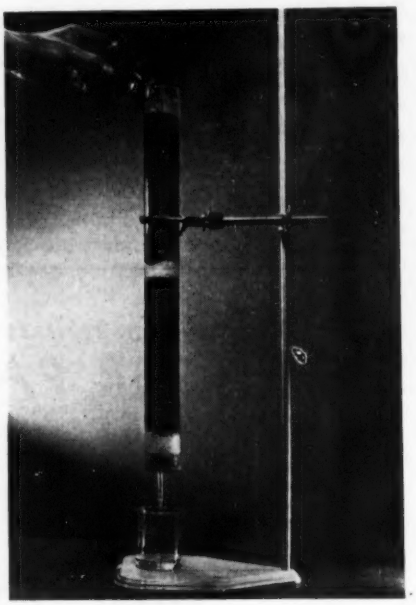
Velsicol Corporation announces a new insecticide concentrate, Vel-Tox, which incorporates Velsicol 1068, a halogenated hydrocarbon possessing exceptional insecticidal power and effectiveness.

Tests have demonstrated that Vel-Tox is many times more lethal to insects than other concentrates.

Vel-Tox exhibits extremely high toxicity to flies and cockroaches, permitting the use of very low percentages of the concentrate in deodorized kerosene to produce 99-100% kills. In addition to the initial 99-100% kills scored by insecticides formulated with Vel-Tox concentrate, the exceptionally low volatility of the active component assures prolonged residual action.

Exchange Resins Remove Fluorine from Water NP 256

Excess fluorine in drinking water, now recognized as the cause of "mottled teeth" (chalky white, brown-spotted enamel) can be effectively removed by the use of Amberlite ion exchange resins, it has been



announced by the Resinous Products and Chemical Company, of Philadelphia, Pa. Experimental work carried on in their laboratory and subsequently confirmed by independent organizations has shown that fluorides can be rapidly and efficiently extracted by passing the water over a bed of Amberlite IR-4-B which has been specially treated with a solution of an aluminum salt—generally aluminum sulphate. The method is ideally suited to water supplies and has proved superior to any others employed. The exchanger is not depleted in the process and can be used repeatedly by a simple regeneration process employing an alkaline solution.

Textile Softener NP 257

A new textile finishing chemical has been announced by the Textile Resin Department of the American Cyanamid Company. It is called Aerotex Softener H. This softener makes it possible to control almost completely the smoothness and suppleness of hand of all types of fabrics regardless of what other chemical treatment they may receive.

As efficient on rayons as it is on cottons and wools, the new softener is well adapted for use with all types of blends, including mixtures of wool and rayon. In contrast to earlier chemical finishes of this type, it offers exceptional resistance to washing and dry cleaning and does not discolor or develop odor.

According to American Cyanamid, Aerotex Softener H is superior to most synthetic softeners since it has less tendency to affect lightfastness properties of direct and developed colors. It has no tendency to discolor white goods.

Use of Aerotex Softener H makes possible the elimination of other wetting agents since it has proved to be an excellent wetting agent itself. The finish also has value when used in a resin impregnation bath to reduce the bleeding of certain dyestuffs during impregnation.

The new softener is a synthetic particularly adapted for use with the new resin finishing processes. It does not affect finishes designed for shrinkage, stretching and creaseproofing control.

Phosphorescent Plastics NP 258

A new series of Lustron phosphorescent molding compounds with greatly increased after-glow effect has been announced by the Plastics Division of Monsanto Chemical Company.

The new 1200 series Lustron materials take advantage of marked advances made in phosphorescent compounds during the war and represent the first application of these compounds in polystyrene molding materials. In comparison with the best phosphorescent thermoplastics available prewar, the new Lustron materials represent an improvement of more than 200 per cent.

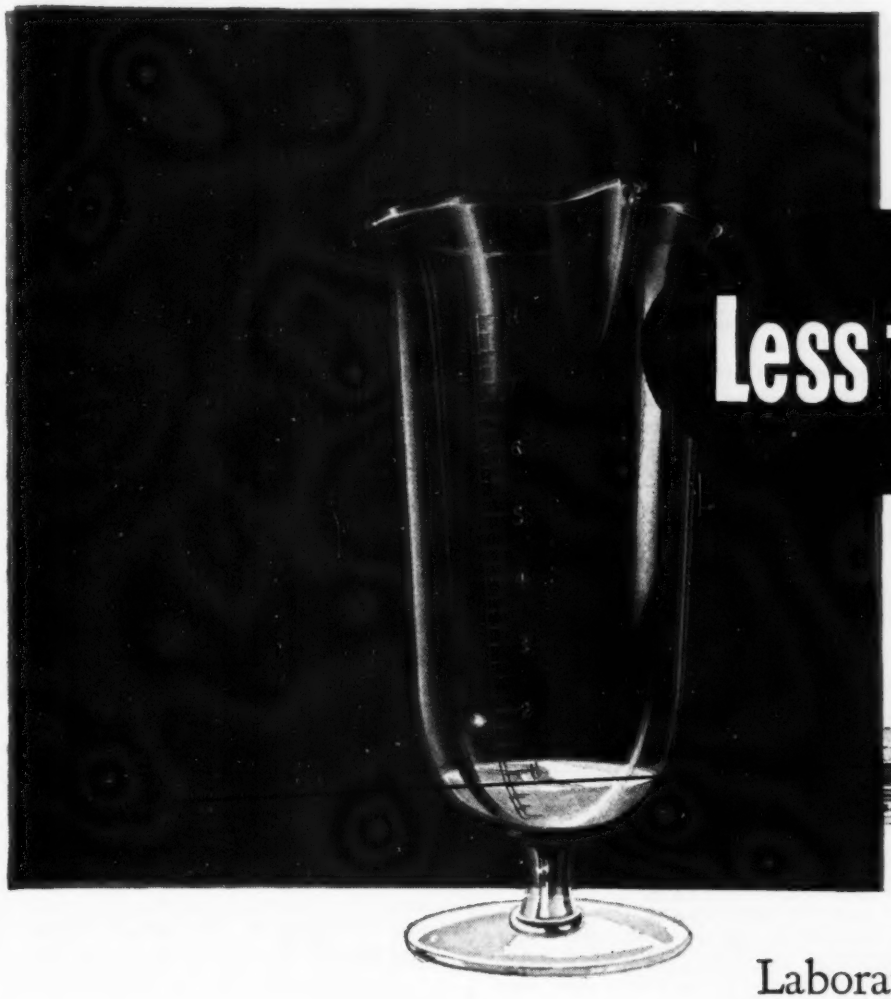
The new materials are expected to find use in switch plates, clocks, instrument dials, auto and aviation dash boards, light pulls, street markers and door numbers. After exposure to sunlight or other illumination molded parts glow visibly for 6 or 8 hours. There is also some fluorescent effect, or glowing, while under illumination by ultra-violet light or other sources.

The new Lustron materials are available in phosphorescent colors of green, green-blue, blue and bright blue. Daylight colors range from green to gray but may be made in a still broader range.

Simulated Leather NP 259

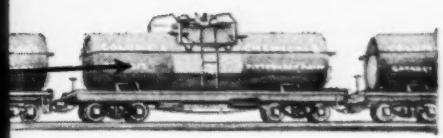
A newly improved simulated leather, known as Terekan 12, which strongly resembles genuine leather in many respects, including workability, eye appeal, and flexibility, has just been announced by Athol Manufacturing Company.

This improved simulated leather is particularly suitable for the manufacture of electric razor cases, portable radio and record player cases, silverware cases, linings for loose leaf book covers, fancy jewelry cases, books, optical cases, cosmetic



Less than 1 oz.

in *40 tons*



Laboratory perfection in large-scale production of **CAUSTIC SODA**

The manufacture of numerous products requires Caustic Soda of utmost "purity"—that is with its metallic content, such as copper or iron, rigidly controlled. In the production of high-strength textiles, for example, the presence of as much as one ounce of these impurities in 40 tons of caustic may result in an inferior product!

Caustic Soda readily picks up such metals, however. To prevent contamination is relatively simple in the laboratory—but production on the vast scale required to meet huge industrial needs necessitates ingenious methods and infinite care in processing and handling.

The achievements in meeting exacting industrial standards—including the patented purification process for producing high grade diaphragm electrolytic Caustic Soda—are characteristic of Columbia operations. They are important reasons for entrusting your requirements for alkalies and related products to Columbia.

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Soda Ash • Caustic Soda • Sodium Bicarbonate • Liquid Chlorine • Silene EF (Hydrated Calcium Silicate) • Calcium Chloride • Soda Briquettes
Modified Sodas • Caustic Ash • Phosflake • Calcene T (Precipitated Calcium Carbonate) • Pittchlor (Calcium Hypochlorite)

novelties, picture frames, notebooks, and for all other applications where leather-like materials are used. It has a very close similarity to genuine leather in resiliency, workability, eye appeal and hand.

Terekan 12 starts with a strong rope fiber base saturated with a synthetic latex. With this synthetic latex, the product has aging qualities and strength which are superior to products treated with natural latex. The saturated rope fiber base is coated with pyroxylin.

Silicone Greases NP 260

To supply the need for high and low temperature lubrication, Dow Corning Corporation has developed four silicone greases which are now available. These new silicone greases designed for the lubrication of ball bearings operating at abnormally high and low temperatures are characterized by a high order of heat stability, low volatility, relatively slight changes in consistency over a wide temperature range, and low freezing points.

Two of these greases, DC 31 and DC 41, are compounded of almost entirely inorganic materials. They are black in color due to the use of very finely divided carbon black as a thickening agent. They contain no graphite. Although they possess exceptional thermal stability, they do show a slight tendency to bleed during storage. Tests indicate, however, that this superficial bleeding does not impair the performance of these greases. DC 31 and DC 41 are corona resistant and are semi-conducting because of their carbon black content. The electrical conductivity of these two greases is in the order of 1000 ohm centimeters.

The other two greases, DC 33 and DC 44, are light brown in color. They are compounded with metallic soaps selected for their heat stability. DC 33 and DC 44 are serviceable at temperatures

High Frequency Destroys Mould NP 261

Bread mould has been conquered electronically by Dr. William H. Cathcart, head of the Great Atlantic and Pacific Tea Company's national bakery laboratories.

The Cathcart process involves use of an electronic "oven" which sends high frequency current through the bread after it is wrapped. This type of energy penetrates each loaf uniformly and kills the mould spores without affecting the taste, texture or nutritive value of the bread.

Declaring that this discovery will make it possible to save at least 150,000,000 pounds of bread ruined by mould each year in bakeries, stores and homes, a company official said that electronic sterilization will also be useful in other branches of the food industry. It is estimated that mould damage to food products amounts to more than $100,000,000 annually.

Under the Cathcart process, bread is rendered mould-proof within five seconds. Mechanically, the process begins after the bread is wrapped and run by conveyor belt to the door of the electronic oven. At this point the bread begins its five-second ride to the other end of the oven, where it emerges in the shipping department.

New Phosphate Speeds Nylon Processing NP 262

Victor Chemical Works has announced successful tests of a new chemical compound in the alkyl phosphate family which will speed up the processing of nylon by eliminating an expensive and time consuming operation as the yarn goes through the dyeing process, and will eliminate spoilage from tangling and bring about greater evenness and stability of color.

The chemical, known temporarily as Phosphate No. 12, is a dye-carrying penetrant which simplifies the dyeing of nylon thread. It may be used in Franklin equipment already standard in modern dyeing plants, thus eliminating the necessity for installation of new machinery for its use.

In addition to providing even penetration of the nylon thread or yarn under treatment, the new phosphate is foam free.

Prior to the Victor development, it was explained by a company official, nylon cakes received from the manufacturer had to be unwound, the thread gathered in skeins, passed through the dyeing and dry-

ANNOUNCING

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High Boiling Aromatics
Petroleum Sulfonates
Rubber Plasticizers
Polybutenes

Aliphatic Hydrocarbons

ISOOCTANE (86%)
ISOOCTENE (86%)
DODECENE (87%)
HEXADECENE*

Now available in *Commercial Grades*, approximate purity as indicated. Specifications and prices in Drums and Tank Cars on request. Available shortly in *Research Grades*. (98%).

*Crude (44%)

INDOIL
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STANDARD OIL COMPANY (INDIANA)
CHEMICAL PRODUCTS DEPARTMENT
910 SO. MICHIGAN AVENUE, CHICAGO 80, ILLINOIS

ing steps, and then rewound on the spools for the weaving or braiding operations. This required considerable manpower which now is unnecessary, and the dyeing of skeins often resulted in tangling and complete spoilage. The Victor process does away with two of the major steps—skeining and rewinding.

The new chemical compound has been found stable in the presence of both acids and alkalis and is non-ionic or neutral in electrical charge. It was found compatible with other constituents of the dyeing bath in a variety of experiments.

Phosphate No. 12 is being produced in a semi-works unit at the Chicago Heights Victor plant, but it is anticipated that a rapidly developing demand will necessitate immediate construction of a large scale manufacturing facilities.

Iron Salts Process NP 263

An autoxidation process has been found applicable for copper mining, the sanitation field in water treatment, chemical treatment of domestic sewage, odor control at sewage treatment plants, sludge conditioning for filtration, and for the industrial waste treatment field where iron salts may be used advantageously.

This process has been in successful small scale operation for over six years at the Phoenix, Arizona, sewage treatment plant. It has proved to be not only effective, but the cheapest known means of producing ferrous sulphate, ferric sulphate or dilute acid, at the place of utilization. Raw materials are scrap iron from a city dump and elemental sulphur Either neutral salt or any desired range of free acid may be produced as required.

It has been shown that, under 1939 conditions, ferric sulphate, $Fe_2(SO_4)_3$ may be produced at a cost of approximately$15 per ton equivalent anhydrous salt, on a scale of 3 tons $Fe_2(SO_4)_3$ per day. Similarly, a low cost is indicated for ferrous sulphate or dilute sulphuric acid, any of which three chemicals may be produced without plant alteration.

This process may operate on either a continuous or batch basis, and on a commercial scale as low as one ton ferric sulphate per day.

Arc-Welding Compound NP 264

A new arc-welding compound designed to aid in instantaneously creating and maintaining a metallic welding arc where low currents and small-diameter electrodes are employed has been announced by the Electric Welding Division of the General Electric Company. Known as Strike-easy, this new compound is easily applied and can be used on any kind of metal with any type of electrode.

The compound, which is in paste form, is available from distributors in one-pound glass jars, completely ready for use. No mixing is required.

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U.S.I. CHEMICAL NEWS

FEBRUARY ★ A Monthly Series for Chemists and Executives of the Solvents and Chemical Consuming Industries ★ 1946

Quick-Dry Varnishes, High Color Retention From 2 U.S.I. Resins

Used with "Soft" Oils to Yield Tough, Quick-Drying Films

Developed during the war, when the cry was for faster bodying in the varnish kettle and faster drying on the production line, two non-phenolic U.S.I. varnish resins are proving of great postwar utility because of the excellent results they produce with the currently available, slow-polymerizing and relatively slow-drying oils.

Arochem 607

Arochem 607 is a high-melting point synthetic resin produced especially for use with linseed, castor and other "soft" oils. It is appreciably better than the usual modified phenolics in four respects: it bodies faster; it yields faster drying vehicles; it gives greater film hardness; it is much superior in color retention and can be used satisfactorily for whites.

In addition to providing the advantages associated with high melting point and large molecular structure resins, Arochem 607 also facilitates processing because of its unusually high solubility in all normal varnish oils. It can be cooked with "soft" oils in the same manner as modified phenolics of corresponding melting points; no special cooking procedures are necessary.

The water and alkali resistance of "607" varnishes are almost equal to those of modified phenolic varnishes; for all but a few special applications, its resistance will be found entirely satisfactory.

Arochem 603

A companion resin to "607," Arochem 603 is a lower priced resin of lower melting point which yields slightly slower bodying and

(*Continued on next page*)

The versatility of Arochem 607 is demonstrated by its many applications in the household. Illustrated here are its uses in rubbing varnishes for furniture, in enamels for Venetian blinds, in architectural finishes for trim, in floor varnishes, and in metal enamels for radiators.

THE MONTH IN COATINGS

Electrostatic paint spraying saves up to 50% in paint, minimizes chipping . . . The "duo-color metal painting system" offers a means of reducing maintenance costs . . . A wall paint blended with DDT proves an effective insect control as long as 16 months after a single coat application . . . Induction heating bakes resin coatings on ferrous metals in a few minutes . . . A number of coatings are developed to increase eye appeal and chemical resistance of plastics . . . An electronic instrument measures paint films deposited on non-magnetic metals . . . Details of certain German processes made available . . . New standards proposed for determining the degree of color change of paints and enamels . . . Use of luminescent pigments booms in textile industry.

New Synthetic Drug Tops Atebrin, Quinine

U.S.I.'s Noval Ketone Vital As Intermediate in Synthesis

A new synthetic drug, said to be superior to both atebrin and quinine in the treatment of malaria, has been developed by U. S. scientists, according to a recent government announcement. The drug, known as "SN 7618," relieves malaria three times as fast as the other two drugs, and produces fewer ill effects. Noval ketone (5-diethylamino-2-pentanone), a product of U.S.I., is an important intermediate in the manufacturing process.

Advantages of "SN 7618"

As a result of research extending over four years, the Board for the Coordination of Malarial Studies found that "SN 7618" is an effective malarial suppressive when administered no more frequently than once weekly in a well-tolerated dose. It will also cause an abrupt termination of the clinical variety of malaria. In addition, it neither discolors the skin nor produces gastro-intestinal irritation —symptoms usually associated with the use of atebrin.

"SN 7618" was the 7,618th drug tested in the four year screening of over fourteen thousand compounds for antimalarial activities.

(*Continued on next page*)

Synthetic Carnauba Wax Production in Sight

It will soon be possible to secure speedy production of synthetic carnauba wax in the U.S., according to a recent government announcement. The synthetic wax — manufactured on the basis of patented German processes now released to American industrialists — is reported to be equal to and, for many purposes, superior to natural wax.

Carnauba wax, now produced principally from the wax palm grown in Brazil, is used in the manufacture of floor wax and polishes, carbon paper, and leather finishes. A new and increasingly important use has been found for it in the preservation of fruit.

Russian Research Uncovers New Uses For Ethyl Acetate

Versatile Chemical Is Employed In Many Novel Organic Syntheses

Ethyl acetate — used principally as a solvent for nitrocellulose and cellulose acetate, and in the production of many pharmaceuticals such as sulfadiazine — offers many new possibilities in organic synthesis, according to papers published in Russian scientific journals during the last five years. This compound has been employed successfully by Russian research chemists in reactions varying from Grignards to the polymerization of vinyl plastics.

New Applications

The following are among the new uses of ethyl acetate reported in the Russian literature:

1. With benzol in the presence of aluminum chloride, ethyl acetate forms 9,10-dimethylanthracene which can readily be oxidized to anthraquinone.
2. Heated with iodine in the presence of aluminum, magnesium, or iron, it produces ethyl iodide.
3. After prolonged heating with 2-mesitylmagnesium bromide, it produces mesitol, mesityl acetate, and the acetate of methyldi-2-mesitylcarbinol.
4. Polyvinyl acetate is prepared by polymerizing vinyl acetate in the presence of ethyl acetate. The solid polymer is obtained by steam-distilling the solvent.
5. With tertiary and secondary butyl magnesium chloride, it forms ethyl butyl ketone and diethyl ketone.
6. It reacts with silicon tetrachloride to form tetra-acetylsilicate, and other silicates and chlorides.

Seminar Group to Discuss Economics of Chemistry

Thirteen specialists from industry will participate in a graduate seminar dealing with economics and cost aspects of chemical industries, it was announced recently. The seminar, which is scheduled to begin early in February, will be held at the Polytechnic Institute of Brooklyn.

Topics to be discussed include: the preparation of economic surveys and appraisals, plant location, cost analysis and estimates, organization and control, and interpretation of financial statements. The course will be offered on Thursday evenings.

Enzyme May Be Remedy For Oak, Ivy Poisoning

The recent discovery that mushroom tyrosinase can render the irritant toxicants of poison ivy and poison oak innocuous adds another plant enzyme to those already known to have the same property. The other enzymes, however, have not been effective *in vivo*. It is hoped by the discoverers that mushroom tyrosinase will have a definite remedial action.

FEBRUARY ★ **U.S.I. CHEMICAL NEWS** ★ 1946

New Synthetic Drug

(Continued from preceding page)

Chemically, "SN 7618" is a member of the 4-aminoquinoline series. It is known as 7-chloro-4-(4-diethylamino-1-methylbutylamino) quinoline. The vital side-chain is added to the basic 4-amino-quinoline group by reaction through noval ketone.

Plans Simplification Of Plastic Nomenclature

To eliminate confusion arising from the lack of uniformity in plastics nomenclature, the Society of Plastics Industries has opened a campaign for proper labeling of plastics. The first step in this program was taken recently with the Society's publication of the "Informative Labeling Guide." This book contains a series of descriptions of various plastics used in consumer goods.

Organic Nitrogen Compounds Made By Direct Amination

A method for producing nitrogen compounds by direct amination of olefins containing more than 3 carbon atoms is described in a recent patent. It accomplishes nitrogen fixation by treating the olefins with ammonia in the presence of a catalyst at temperatures between 400 and 650 degrees F.

Direct nitration offers a simple method for preparing nitriles and amines. By this method, for example, ethylene and propylene can be converted to acetonitrile, acrylonitrile, and ethyl, isopropyl, and n-butyl amines. These compounds are vital in the making of plastics and synthetic rubber.

U.S.I. Announces New Feed Fortifier

Curbay B-G 40 is a new low-cost fermentation product, containing the vitamins of the B-complex, and has a guaranteed riboflavin content of 40 micrograms per gram. This newly announced U.S.I. product is rapidly winning wide acceptance among poultry-and-stock feed formulators.

Quick Dry Varnishes

(Continued from preceding page)

slower drying varnishes. Otherwise, the properties obtainable are quite similar.

Find Many Uses

Many manufacturers are finding these resins ideal for use in quick-drying enamels, porch and deck enamels, vehicles for architectural and industrial finishes, spar varnishes, gloss inks, and other coatings which are in such heavy demand today. Especially, these manufacturers report excellent results in whites because of the pale color and high color retention of these resins.

Specifications

	AROCHEM 607	AROCHEM 603
Acid Number:	25-35	25-35
Melting Point:	155-165°C.	130-140°C.
	(Mercury Method)	
Color:	9-11	9-11
	(G.H. 1933—50% cut in Toluol)	

Solubility: Complete in petroleum hydrocarbons and the usual varnish oils. Insoluble in alcohol.

Arochem 607 is a vehicle for a wide variety of white and colored industrial finishes. Parts of toy trains, such as those illustrated here, retain their color longer when coated with varnishes based on this modified phenolic.

Decreases Hosiery Runs

A patent has been issued on a new preparation to inhibit runs in sheer hosiery. The preparation, claimed to have a run load characteristic of 2½ pounds, consists of zinc resinate, ammonia, water, and a mixture of isopropyl alcohol and acetone.

TECHNICAL DEVELOPMENTS

Further information on these items may be obtained by writing to U.S.I.

A new fungicide, said to be effective against numerous diseases that attack growing plants, has been announced. **(No. 030)**

U S I

Transparent plastic sheets, claimed to be non-electrostatic and shatter-proof, are now available for a variety of applications. They are said to be easily shaped into windows for precision electrical instruments. **(No. 031)**

U S I

A new paint stripper is claimed to be non-destructive to aluminum, zinc and other base metals. It is said to remove synthetic enamels and many other types of tough organic coatings cleanly and rapidly. The product is diluted with warm water. **(No. 032)**

U S I

Heat-screening glass, said to be capable of screening about 90% of infrared, or heat, radiation from light while transmitting 85% of visible radiation is available for many applications ranging from housing to therapeutics. **(No. 033)**

U S I

Silicone oils, which are said to flow at temperatures as low as —121°F., are described as suitable for use in aircraft hydraulic systems, in fine instruments, and as a dielectric fluid in capacitors and transformers. **(No. 034)**

U S I

A new moisture detector, described as being based on an electronic principle, is recommended for detecting leaks. **(No. 035)**

U S I

To remove scale, a new "alkaline pickling" process is offered for application to metal surfaces. The process is said to eliminate pitting and hydrogen embrittlement. **(No. 036)**

U S I

To secure linoleum in place, an adhesive trowelling material stated to be immune to the attacks of water, is claimed to be easily applied to concrete surfaces. **(No. 037)**

U S I

Redyeing olive drab and other shades of wool material for civilian use is said to be accomplished by a simple process. A booklet is available describing the process and the dyes used. **(No. 038)**

U S I

A waterproofing, bonding mortar, claimed to be made by mixing a liquid chemical with cement, is said to be effective for use in stopping leaks, eliminating seepage, and in patching and waterproofing pits and concrete pipes. **(No. 039)**

U S I

A dew point recorder, is claimed to provide virtually continuous record of humidity within a temperature range of —70° to +60°F. **(No. 040)**

U S I

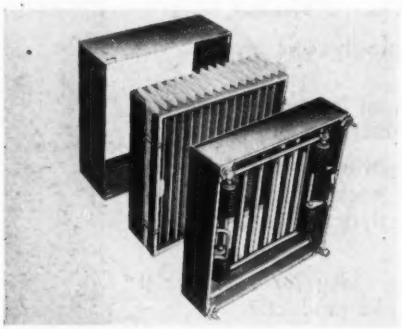
To handle any shaped drum, cradle handles are said to be able to pick up barrels with straight, bilged sides, flat or chimed sides. **(No. 041)**

U S I

NEW EQUIPMENT

Air Filter QC 736

The American Air Filter Co. has announced a line of electronic air filters, the Electro-Airmat, in which the collector element is electrostatically charged Airmat paper. The arrestance rating of the Electro-Airmat, when tested by the



discoloration method, is 90% or better with atmospheric dust or smoke. This efficiency is obtained at a velocity of 35 f. p. m. through the Airmat media and the standard rating of 1,000 c. f. m. per standard-sized 24″ x 24″ unit. The filter weighs 40% less than electronic filters having metal plate collectors and requires 30% less floor area.

The porous nature of Airmat also makes it a highly efficient mechanical filtering media; thus, when the power is off for any reason it affords ample protection against the infiltration of dust due to "stack effects" in air conditioning systems.

The power pack operates on a 110 volt 60 cycle single phase current. Total power consumption is approximately 220 watts at 110 volts including transformer losses in the power pack. When the Airmat paper has accumulated its dust load it is removed and replaced with clean material by means of turning a crank in a mechanical loader which automatically folds the paper into the serrated base section of the filter unit. Spare cells loaded with clean Airmat can be provided for convenience in servicing. For small installations requiring only a few units, a manual loader answers the purpose.

9% Nickel Steel QC 737

The recently developed 9% nickel steel has been formed into tubing by the Babcock and Wilcox Tube Co. for the first time. This tubing was developed primarily to answer the needs of plants handling liquefied gases or other low temperature fluids and exhibits good physical properties at temperatures as low as —320° F.

It is also reported by the manufacturer that this product may work in many places as a substitute for 18-8 stainless steel tubing in places where salt water and hydrogen sulfide present a difficult corrosion problem.

The new tubing is capable of giving Charpy impact values as high as 25 foot pounds, even at —320° F. It is stated that the new alloy offers greater resistance to attack by alkaline media and to low temperature embrittlement than any other nickel alloy steel tubing regularly produced by the company.

The finished normalized tubing shows very satisfactory physical properties and withstands the usual deformation tests on flattening, flanging and crushing. Minimum tensile properties of the tubing are specified as follows: ultimate strength, 80,000 psi; and elongation 20 per cent in two inches.

Temperature Controller QC 738

For operations where rate of temperature increase or decrease must be controlled, as well as the actual processing temperature and duration, The Foxboro Co. has developed the CycleLog Controller, which is now available as a standard item in the company's line of instruments.

The name CycleLog was adopted as expressing the instrument's unique function in controlling and recording all the steps of a complete process cycle. No time cams or supplementary instruments are employed. CycleLog control is completely automatic, according to whatever schedule is predetermined by adjustments of four setting knobs on the instrument panel.

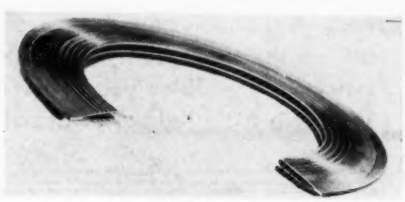
In batch dyeing, for example, the CycleLog Controller will bring the bath

temperature up from any starting point, regardless of daily or seasonal variations, to the desired holding point, and do this at any desired rate of rise from 1-8° F. per minute. It will then hold the bath at the correct temperature for the right period of time, and then shut off the heat supply, and signal the operator that the cycle has been completed. By reference to the instrument chart and its notations, any cycle can be exactly duplicated as desired, in any similar plant regardless of season.

The CycleLog unit is unique in combining deferred action and elapsed-time features with the new rate of rise control.

Pressure Sealed Gasket QC 739

A serrated type gasket, known as Bellowseal, is announced by the Goetze Gas-



ket and Packing Co. It utilizes the pressure to be sealed to exert a corresponding sealing pressure on the flange faces.

The gasket consists of two discs of metal (armco iron, low carbon steel,

CHEMICAL INDUSTRIES TECHNICAL DATA SERVICE

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Please send me more detailed information on the following new equipment:

QC 736	QC 740	QC 744	QC 748	QC 752
QC 737	QC 741	QC 745	QC 749	QC 753
QC 738	QC 742	QC 746	QC 750	QC 754
QC 739	QC 743	QC 747	QC 751	QC 755

Name ..... (Position) .....

Company .....

Street .....

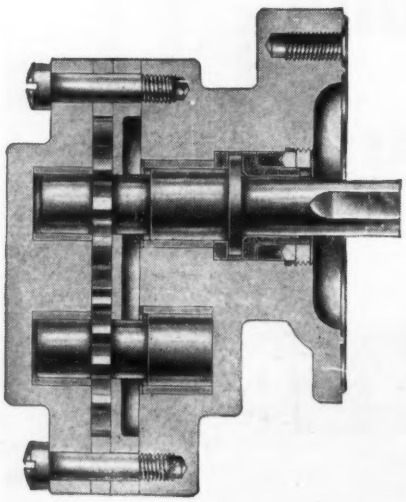
City & State .....

monel or stainless steel) machined on their external faces with standard serrations and welded together around their outer periphery.

It combines the pressure and corrosion resistant qualities of metal gaskets with the light bolting requirements of a softer sealing medium.

Pump QC 740

Marco Company, Inc., announces the velopment of a positive displacement, constant volume, high vacuum pump which



will maintain volumetric efficiency against normal wear. The pump is precision built and will transfer, meter, or proportion. It is easily cleaned and sanitary as there are no threads exposed to the product and no pockets exist in which materials might become lodged to harbor bacteria.

One of the outstanding characteristics of the Flow-Master pump is the automatic wear control which guarantees the efficiency of the pump during its normal life. Capacities range from 50-10,000 gallons per hour.

Operating at 100 psi and 1740 rpm, it is indicated that a maximum efficiency of over 50% will be reached at 1000 hours pump operating time.

Cooler QC 741

The National Radiator Co. has developed the new U-Cast Hairpin Cooler Element. The new unit is used for cooling any liquid, but is especially adapted for cooling acids or strong alkalies under corrosive conditions.

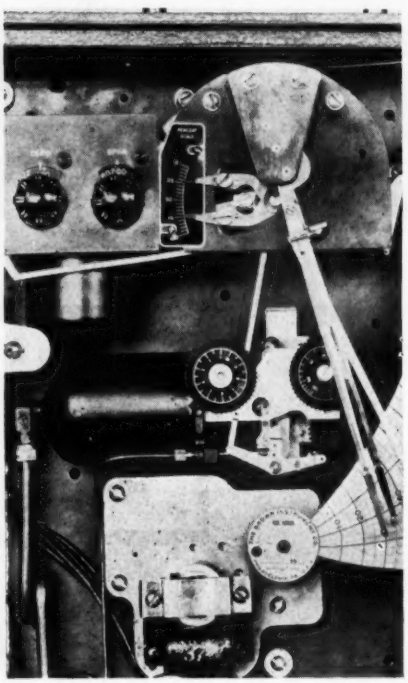
The new elements in these applications are submerged in the solution and the coolant, usually water, is passed through the element itself. The sections of the unit are cast of gray iron that is highly resistant to attack from both the solution and its fumes.

The National Radiator Co. developed the new elements at the request of the Ordnance Department. The coils formerly used in the acid cooling vats of munitions manufacturers had to be completely replaced at least every three months. After months of service in the same vats the new cast iron elements showed no corrosion either above or beneath the liquid line. In some cases a small amount of sulphate deposit formed above the liquid line, but a coating of acid-resistant paint eliminated this. The cooling capacity and efficiency of the new elements were as satisfactory as or better than the coils formerly used, the plants reported.

Indexet QC 742

A new indexet has been perfected by the Brown Instrument Co. The new device, known as the "Adjustable Indexet," is described by engineers of the Brown Company "as essentially a pneumatic receiver with two new mechanisms added, consisting of 'span' and 'zero' shift."

The span or proportional adjustment permits a change between the span



through which the instrument control point is moved and the change in transmission pressure which moves the control point. Span dial is calibrated in terms of the distance in per cent of full scale that the control index will move along the chart per full scale changes in pressure. Span is the multiplying and dividing adjustment.

The zero, or linear, adjustment adds or substracts a constant value. The zero dial is calibrated in terms of full scale and moves the zero position along the chart.

The new adjustable indexet was deveveloped to meet a demand for an improved pneumatic indexet type of instrument that will set a control point in which both span and zero shift can be adjusted conveniently without upsetting the control point.

The new adjustable indexet features: (1) Span adjustment, 0 to 200 per cent; (2) Zero shift adjustment, minus 100 to plus 100; (3) Readily accessible adjustments without chart disturbance; (4) Control point is undisturbed when making adjustments; (5) Direct action; (6) Limit stops prevent the control index from exceeding any desired limits.

Gas Mask And Splash Hood QC 743

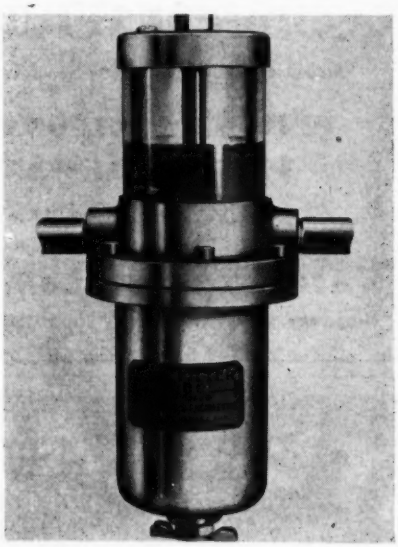
A new combination gas mask and splash hood is announced by Industrial Products Co. It is designed to give full head and respiratory protection from toxic gases and fumes accompanied by the hazard of splashes of acids, caustics and other harmful substances.

It is made up with a Full-Vision gas mask attached to a complete head covering of Neoprene synthetic rubber. All seams are fully vulcanized. The hood is demountable and may be easily and quickly removed from the mask for cleaning or replacing when necessary.

The straight canister type gas mask is used for emergency and short period use; for longer period and day to day use a hose is attached to a compressed air line.

Filter and Lubricator QC 744

CCA Filter-Lube, a compact pneumatic filtering unit combined with a precision lubricator, is announced by CCA Prod-



ucts Engineering. The primary use of Filter-Lube is for installation near the equipment it is intended to service, including air cylinders, vises, chucks or any reciprocating or rotary air tools.

Filter-Lube is available in ¼", ⅜" and ½" standard pipe line sizes.

A needle valve oil regulator, easily adjustable to meet all varying lubrication

requirements, permits the correct amount of oil to mix with filtered operating air.

The lower element of CCA Filter-Lube is composed of a sludge basin of ample size and an all wool felt filter media. Fully automatic in operation, the device first filters incoming working air, and next provides a finely adjusted lube-mist, perfectly regulated according to equipment requirements. Through use of the device, no flood of oil is permitted to enter working equipment, and no oil starvation is possible; eliminating loss of equipment and repair time. Filter-Lube functions only when equipment is in operation.

Tool for Replacing Gaskets QC 745

The hazardous hammer and tool methods of gasket renewal are eliminated by Flange-Jacks, which are capable of opening joints against a load of 15 tons—without damage to the flanges. As pressure is exerted, flanges open evenly and bolt holes are maintained in continuous alignment. Closures are accomplished in a similar manner.

The tools are one-piece steel forgings with a case-hardened screw point. The standard size opens all two inch to twenty inch flanges. Flange-Jacks are a product of T. G. Persson Co.

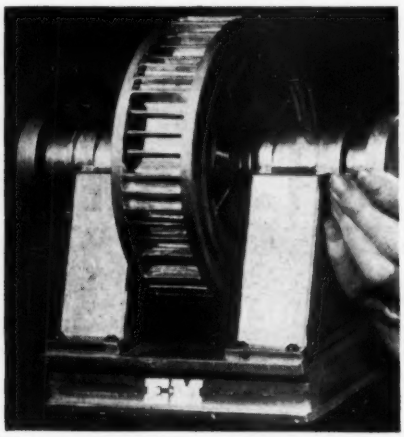
Soldering Irons QC 746

A new line of industrial soldering irons has been announced by the Industrial Heating Division of the General Electric Co. Ranging from 75 to 300 watts in size and available with tips from ⅜ to 1¼ inches in diameter, the new irons are designed primarily for soldering operations in industrial plants where fast, continuous, high quality soldering is required. They are also very suitable for light, medium, and heavy intermittent soldering.

An important feature of these irons is their quick recovery and high reserve-heat capacity, which permit soldering as fast and continuously as the character of the work allows. Another feature is the use in these irons of calorized (surface-alloyed with aluminum) copper and 18-8 stainless steel for all parts subjected to high temperatures. The Calrod heating units can be easily replaced, since only one simple connection must be unsoldered in order to slip a new unit into place. The chisel-shaped copper tips are also calorized, which retards corrosion, facilitates easy removal, and prevents the tip threads from "freezing" to the tip holders. The irons are also furnished with iron-clad copper tips. The working ends of these tips are surfaced with iron, which will not amalgamate with the tin in the solder, as copper does. Hence pitting and erosion of the tips are obviated and, consequently, filing is unnecessary.

Adjustable Drive QC 747

Wide-range, quick-response speed control for pumps, blowers and compressors is provided by the new E-M magnetic adjustable-speed drive, a product of Electric Machinery Mfg. Co. It consists of two operating parts, a rotating ring and a rotating magnet. The magnetic drive is a self-contained electromagnetic torque transmitter used in combination with a constant speed AC motor and an electronic controller to provide split-revolution speed control.



It is built in ratings approximately 25 h.p. and larger at 600-1800 r.p.m. The magnetic adjustable-speed drive provides substantial power savings by operating boiler draft fans at reduced fan speed for partial fan output, eliminating damper or inlet vane control. The life of induced draft fans operating in erosive gases is greatly increased by reduced speeds at partial fan outputs.

Protected Metal QC 748

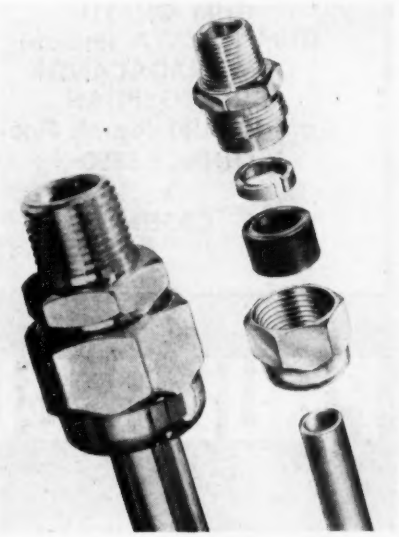
"Plastipitch", protected metal for roofing and siding on industrial and agricultural buildings, has been developed by Koppers Company, Inc., Tar and Chemical Division.

The product consists of flat, corrugated or V-crimp metal sheets which have been treated with "Plastipitch" a compound which provides permanent adherence to metal at low as well as high atmospheric temperatures and protects the base from rusting, corrosion, salt air and the effects of chemical fumes present in many areas. After the "Plastipitch" coating the sheets are provided with additional surfaces to give added protection.

The sheets can be easily fabricated without special equipment and can be bent without impairing the coating because of its toughness and elasticity.

Tubing Fitting QC 749

Flexigrip tubing fittings, which eliminate end preparation or soldering of the tubing and yet produce a stronger flexible joints, have been announced by Gustin-Bacon Manufacturing Co. The Flexigrip fitting, made in standard sizes from ⅛" to 1½" O. D., consists of four parts —the body, a gripping ring, synthetic rubber gasket and nut. To attach the fitting, the nut (with gasket and ring inside) is slipped over any plain-end tube and cut to desired length. The tubing end is inserted into the body as far as it will go and the nut tightened. Tightening the nut compresses the ring and moulds the gasket to the ring for a flexible leak-proof seal.



Elimination of flaring, swedging, or soldering the tube end adds to the strength of the joint as well as saving time and labor. Flexigrip tubing fittings are available in brass, aluminum or steel.

Calculating Device QC 750

A new calculating device for measuring radiation for steam and hot water heating systems has been announced.

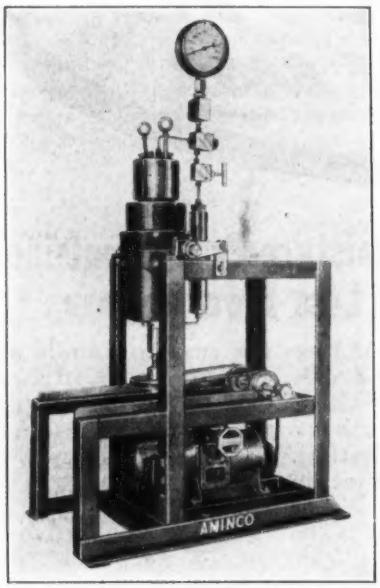
It is claimed this new calculating device, Heat-O-Meter, (physically a round dial with three concentric celluloid printed discs) eliminates the tedious figuring, usually necessary to determine the correct amount of radiation, and can successfully and easily be used by anyone without previous technical training.

The dial contains sizes of mains, returns, risers, radiator sizes and capacities, round and sectional boiler net ratings, chimney flue sizes and capacities with minimum and maximum heights, hot water tank sizes and capacities, fuel oil tank

sizes and capacities, hot water generator capacities and other heating information.

Laboratory Autoclave QC 751

A new laboratory stirrer-type Superpressure assembly, announced by the



American Instrument Co., has a capacity of 845, 1410, 2960, or 1780 ml., for operation at pressures up to 10,000 lb. per sq. in. and at temperatures up to 750° F. Other sizes are available.

Means are provided for tilting the reaction vessel (autoclave) for its contents to be poured or scraped out.

The apparatus is equipped with a thermowell, stirring-type agitator, a pressure-lubricated stuffing box, an electric heating jacket controlled by a three-heat switch, a safety blowout assembly, a 6-in. hydraulic pressure gage, and necessary valves and fittings. The agitator, whose shaft enters through the bottom of the autoclave, is driven by a variable-speed motor. Both the motor and the heater are for operation on 115 and 230 volts, 60 cycles, single phase.

The entire assembly is mounted on a sturdy welded structural steel frame.

Gas Detection QC 752

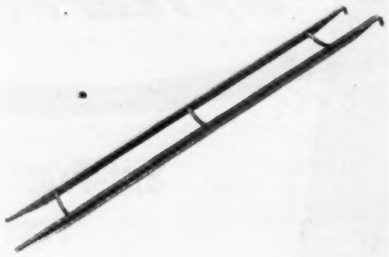
The Davis Emergency Equipment Co., Inc., announces an extended line of gas detection and gas analysis instruments. These result from an exclusive license to manufacture and sell special thermal conductivity cells under W. O. Hebler Co. U. S. P. 2,269,850.

The new line of instruments, which will incorporate the previous Davis line of combustible gas alarm systems, will include safety equipment for the detection and analysis of combustible gas or vapor in air. It will also detect and analyze any one gas. The detection and analysis of any one gas in a complex mixture, for gas purity or gas proportioning, will also be possible.

All of the new instruments will be available with direct reading meters, circular chart or strip chart recorders.

Barrel and Box Skid QC 753

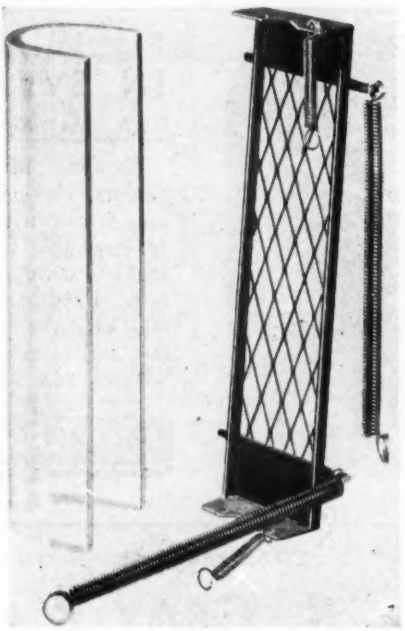
The new skid of Palmer-Shile Co. is said to be much lighter in weight, yet



substantially stronger than the older type skids built of a combination of wood and steel. The 8′ length skid, which measures 14″ wide, weighs but 45 pounds, is all welded construction, and will hold any weight load that can be placed on it.

Gage Glass Protector QC 754

The Wright-Austin Co. has recently developed a new "Kleervu" gage glass protector, trade named "Kleervu." This



protector consists of two parts—the metal frame, with four holding springs, and a ¼″ transparent "Nuglas" cover.

When installed, the "Kleervu" encloses the gage glass within a protective transparent cover so that should the gage glass burst or explode, all flying, broken glass is safely confined within this shatterproof enclosure.

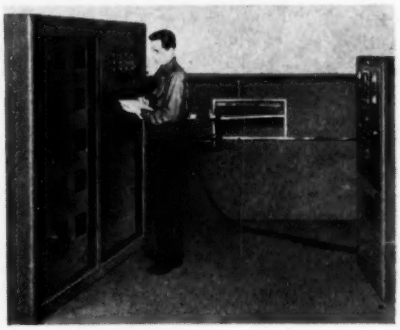
While protection is absolute, there is no loss of visibility—no blind spots—no corners. The glass-clear cover encircles the gage on three sides. Visibility is clear from all directions.

In the back is a screened frame which holds the cover and provides an open vent area for escaping steam in case of gage glass breakage, thus avoiding any pressure build-up within the protector.

Quantometer QC 755

A new direct-reading instrument for the quantitative chemical analysis of as many as eleven elements in metal alloys, chemicals, and many other materials in less than one minute, has just been announced by the Applied Research Laboratories, and the Harry W. Dietert Co.

The principal advantage of the Quantometer is the great speed with which it



can simultaneously and automatically measure the quantities of a number of elements present in a sample. The results appear directly as percentage composition on a series of counters, one for each element being determined. Only one operator is necessary.

The rapidity with which analyses can be performed is certain to revolutionize many processes where step by step control of composition is necessary. For instance, in the metal producing industry alloys produced can be kept to much narrower specification-limits than has heretofore been possible. This may well usher in a new era of alloys by providing optimum physical properties by means of exact chemical and physical control.

The Quantometer consists of three units, a source unit which provides a powerful spark to the sample being analyzed, a spectrometer which disperses the light from the spark into a spectrum, and a recording console where the final analyses are shown.

The source unit differs from the conventional units used in spectrochemistry chiefly in the very high-intensity discharge produced. The spectrometer employs an original diffraction grating and is fitted with twelve receivers arranged to record light from as many spectrum lines. These receivers, employing highly accurate integrating electrical circuits, replace the troublesome photographic emulsion used in spectrography. The recording console supplies all of the various voltages required to operate the receivers and houses the counting units which provide the final direct analyses.

PACKAGING & SHIPPING

by T. PAT CALLAHAN

Phenol Handling and Shipping

PHENOL U.S.P. is a regulatory product as defined by the Interstate Commerce Commission and consequently must be packed and shipped in conformance with I.C.C. regulations. It is classified as a Class "B" poison.

Many forms of packaging are used. For small units, the usual containers are 1-pound and 5-pound bottles packed in outside wooden or fibre cases complying with I. C. C. specifications.

T. Pat Callahan

For medium units of 10 pounds, 25 pounds, 50 pounds and 100 pounds, metal cans or drums are used. A certain type of liquid phenol is shipped in glass carboys, and these consist of glass bottles enclosed within a wooden box meeting specification ICC 1A of the Interstate Commerce Commission.

In addition to this, phenol is shipped in 200- and 450-pound units which are packed in approximately 23-gallon ICC 17E drums or 55-gallon ICC 17E drums for non-returnable shipments and ICC 5 or 5B drums for returnable shipments.

Phenol melts at 40-41° C. and, except in very hot summer weather, it is necessary to melt it to remove from containers. In the melting operation it is always essential that the closure be loosened sufficiently to provide an air vent before starting to melt the product in the container. In the melting of metal drums, steam heated closes or cabinets may be used. It is essential that the openings are up and loosened.

All drums of this material are shipped with sufficient outage to take care of any expansion occurring during the melting.

Extreme care in the handling of containers is essential as phenol is corrosive to the skin and produces painful and dangerous burns. The Labeling and Precautionary Information Committee of the the Manufacturing Chemists' Association has adopted the following label to be placed on all containers in which phenol is shipped:

DANGER! Rapidly absorbed through skin.
Causes severe burns.
Do not get on skin or in eyes.
Avoid breathing vapor.
Do not take internally.
In case of contact, immediately flush skin or eyes with plenty of water for at least 15 minutes; remove and wash clothing before re-use. For eyes, get medical attention.

This label has been approved by representative members who manufacture phenol and it will definitely help in providing workmen with sufficient warning to insure safety in the handling of containers carrying phenol.

A large percentage of the phenol shipped is transported in ICC 103 tank cars constructed of steel, but in some cases, where water-white color is desired, nickel-clad steel tank cars are used.

All tank car equipment is provided with heating coils and safety vents. One of the most important factors in connection with unloading phenol is the removal of the safety vent before any steam is placed in the coils. The safety vent can be located on the dome of the tank car and is stenciled "AIR—Open First."

When this is done, steam is turned into the coils, using about 10 to 15 pounds pressure for the first hour or two and at no time should the pressure go above 100 pounds in the coils. When the phenol is melted, it can be unloaded by either a pump or air pressure. Care must be taken to avoid excessive air and 15 to 20 pounds pressure should be sufficient for this purpose.

Also stenciled on the dome of the tank car are the words "ACID—Open Last", and this denotes the standpipe to which connections should be made to unload the tank car.

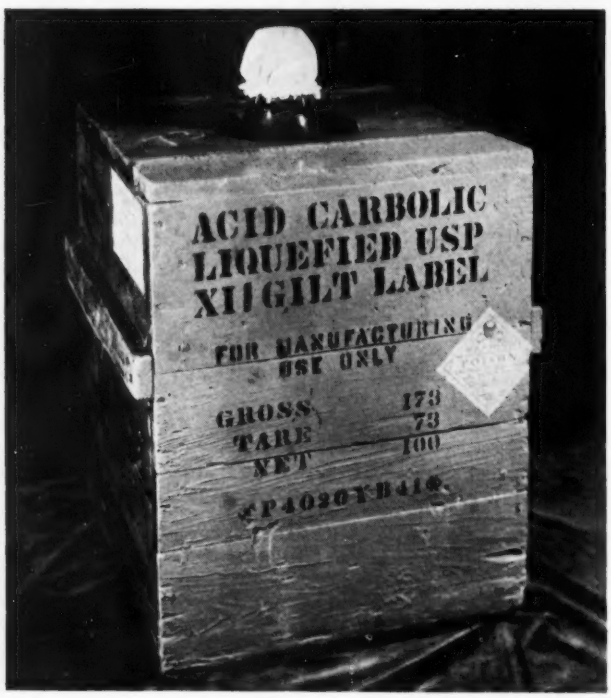
While bottom unloading is used in some cases for the removal of phenol it is not recommended if it is possible to employ top unloading.

Many of the large companies have issued instructions and we quote certain suggestions which have been issued in this connection by one of the large shippers of phenol:

"Summary of Top-Unloading Operations

"The essential operations in unloading a phenol tank car are:

1. Open the vent to release pressure in the car.



Glass carboy (left) showing the ICC poison label required on each container of phenol. Above ICC17E drums, each containing 450 lbs. of phenol.

2. Attach air connections.
3. Connect the steam line to the heating coils.
4. Turn in the steam at LOW (10-15 lbs.) pressure.
5. Examine the drip from the heating coils for evidence of leaking coils.
6. Heat the entire contents of the car to about 70° C.
7. Stir with dry air.
8. Sample the phenol.
9. Unload through the standpipe in the car dome.

OBSERVE SAFETY PRECAUTIONS —TAKE NO CHANCES."

"Bottom-Unloading—Tank Cars

"Emergencies may arise that make it necessary to unload from the bottom outlet. Under such circumstances, proceed as follows:

1. Remove the dome cover and note whether the contents of the car are solid or liquid. (Phenol may be liquid in midsummer.) IF LIQUID, CHECK TO BE SURE THE PLUG VALVE IS SEATED.
2. Remove the cap from the bottom outlet and connect the valve and other piping for unloading.
3. Connect steam to the heating coil and melt the phenol as previously described under 'Top-Unloading'.
4. When the phenol is well melted, stir and sample as previously described under 'Top-Unloading'.
5. Shut off the steam from the coils and direct live steam against the bottom outlet leg until it is hot enough to melt all the phenol in this area. Have the plug valve OPEN and the unloading line valve (see Operation 2 above) CLOSED during this operation.
6. Open valve and unload car.
7. After unloading the car, prepare it for return to the shipper as hereinafter described.

CAUTION: Unloading from bottom outlets involves considerable risks and should be done only when other means are not available. Take all possible precautions as regards protective clothing, goggles, etc. Be sure all connections are tight."

"Preparation of Empty Car for Return to Shipper

a) The line to the storage tank is disconnected and the cap is screwed on the standpipe.

b) The steam fittings are removed from the coils and the caps are screwed on. In freezing weather it is important that the coils be blown out with air before replacing the caps.

c) The air connections are removed from the car and the vent connection, with the lead disc in place, is replaced on the vent nipple.

d) Care should be taken to have the dome cover on tight before returning the empty car.

e) Do not permit any water or steam condensate to enter the empty car."

Census Bureau

(*Continued from page 255*)

FT-110A Animal and vegetable products.
FT-110B Textiles, wood, minerals, etc.
FT-110C Metals, machinery, chemicals, etc.

FT-120 Country-by-commodity data. This covers 138 countries and may be optionally ordered in three sections:
FT-120A North and South America.
FT-120B Europe.
FT-120C Asia, Australia and Africa.

Figures on imports-by-Customs Districts are not published but are available on request to the Census Bureau.

Export statistics on 3,500 individual commodities are published in three series analagous to those just listed for imports, with corresponding series being respectively numbered FT-400, FT-410, and FT-420. Series FT-410, however, includes 10 sections, of which FT-410-1 covers "Chemicals and Related Products." Series FT-420 has 9 sections presenting country-by-commodity data for 9 different groups of the 138 countries covered. Separate series of reports on exports cover Lend-Lease (FT-415 and FT-425) and UNRRA operations (FT-416 and FT-426).

"U. S. Trade With Its Territories and Possessions" (FT-800) presents detailed commodity figures.

The new FT series of reports are described in two Census Bureau catalogs entitled "U. S. Foreign Trade Statistical Publications—Monthly reports starting with statisics for January 1945" and "U. S. Foreign Trade Statistical Publications—Reports covering calendar years 1941-1944."

EXPLANATION OF STATISTICS

Because of the great influence of the war on United States foreign trade figures, particular attention is called to the desirability of referring to explanations of the statistics. The most comprehensive statement of this sort is a separate printing of the "Explanation of Statistics of Foreign Commerce and Navigation of the United States" from the annual publication "Foreign Commerce and Navigation of the United States—Calendar Year 1942." This extract contains a full description of the compilation procedures and any limitations of the import and export statistics. Copies of the extract are available upon request.

Also valuable are "Commodity Schedules A and B" which contain a detailed listing of the statistical commodity classifications in which export and import statistics are reported:

Schedule A. Statistical Classification of Imports Into the United States—1943 Edition
Schedule B. Statistical Classification of Domestic and Foreign Commodities Exported from the United States—1945 Edition
Part I. Alphabetical Index
Part II. Numbered Classifications and Articles Included (more useful than Part I in interpreting the export statistics in terms of the individual articles included in each statistical commodity classification)

FUTURE PROGRAM

The Census Bureau has developed a comprehensive program of broad statistical coverage of the nation's industrial and commercial activities and important sections of the program have already been approved for action.

In the past, major emphasis in the statistical program of the Census Bureau has been placed on the periodic complete census taken at intervals ranging from 2 to 10 years. The new program recognizes that business needs cannot be met merely by collecting facts at such intervals. Markets change rapidly in response to the development of new products, new distribution methods, and changes in population and purchasing power. The new statistical program recognizes the importance of current statistics to enable business and Government to keep abreast of changes in the economy and in the population, not only for the country as a whole but also for its major subdivisions. In consequence, the central idea of the program is to take detailed benchmark censuses concurrently at 5-year intervals, supplemented, for the most significant items, with current and annual data on a fully comparable basis.

The program contemplates the following reports to cover the year 1946:

1. Census of Manufactures
2. Census of Mineral Industries
3. Census of Agriculture (actually under way for 1945)
4. Census of Business (wholesale and retail distribution and service trades)
5. Census of Population, Housing and Labor Force
6. Consumer Income Survey

These would enable analysts to establish the relationships between producers, distributors and consumers.

Confining further discussion to the first two items listed, which are the chemical market researcher's main interests, the Census of Manufactures will include the usual detailed information on number, size and location of establishments, employment, wages, volume of output, cost of materials, etc. As compared with the 1939 report, it will be broadened through greater commodity detail and more comprehensive information on the consumption of materials at different stages of manufacture, and will include a number of analytical special-purpose tables. This will make it possible to determine at least in broad outline the changes caused by the war, including shifts in products, changes in the size distribution of manufacturing establishments, the position of the various industries as a source of employment and wages, shifts in the fortunes of particular industries, changes in the productivity of labor, and many other significant industrial developments. Regional, state and other geographical compilations will contribute greatly to an understanding of the altered importance of each section of the country with respect to production, employment, and markets for raw materials and semifinished goods. Furthermore, the censuses, since they include all manufacturing and mining establishments, will provide a general bench mark in terms of which current statistics collected by public and private agencies may be appraised and adjusted so that their accuracy and dependability may be increased.

The current figures on manufactures will provide monthly, quarterly or annual data on commodities representing about 130 of the approximately 400 industry groups covered by the Census of Manufactures. In terms of economic importance, however, the proportionate coverage is much higher than this, since all of the large income-producing industries are included in the program. In addition to the usual measures of current volume, data will be compiled on such advance indicators as orders booked and stocks of finished products.

To tie up the current statistical data with the quinquennial Census, the Bureau is planning an Annual Survey of Manufactures to present industry totals, broken down by states and cities. A companion report will present detailed commodity data taken from the series of current reports and the Annual Survey of Manufactures.

The 1946 Census of Manufactures has been approved by Congress and will go ahead on schedule. Current manufacturing statistics are now being compiled as described above in the section on "Facts for Industry" reports. Some shift in coverage must be expected. For example, some of the strategic and critical items included in statistical reports required by the War Production Board will give way to items selected for their commercial interest. The Chemical Unit of the Census Bureau, which now includes fats and oils, plastics and rubber, is studying half a dozen new "Facts for Industry" series which it is hoped can be announced shortly. The Census

(*Turn to page 317*)

LABORATORY NOTEBOOK

Low-Temperature Cabinet

A new controlled humidity and low temperature test cabinet has compact, self-contained refrigeration and provides 12 cu. ft. of space in which a high degree of accuracy in both temperature and humidity conditions may be maintained. Model NL-950 (G), shown in photograph, is completely automatic and is

portable. The refrigeration system combines an air cooled condenser with direct expansion of Freon in the evaporator coils within the test box. Control is effected by means of two separate potentiometer thermocouple indicating controllers sensitive to minute temperature change trends. The controllers are mounted, as shown on a standard communications relay rack cabinet and is equipped with a 10 foot multi-electrode cable and plug assembly for plug in on the cabinet, and is available from Northern Laboratories, Ltd., 3-01 27th Ave., Long Island City 2, New York.

Its temperature range is minus 50°C. to plus 60°C., while humidity conditions of 10% R. H. to 95% R. H. may be held nearly constant above 3°C.

Recording Analyzer

An instrument which electronically measures the concentration of elements in alloys and automatically records the results has been developed by J. L. Saunderson and coworkers at Dow Chemical Company, Midland, Mich. This direct-reading spectrometer, as it is called, has been in use in the company's magnesium alloying plant for several months, where alloy analyses can now be made in 40 seconds, a fraction of the time required when using the standard spectrograph. The substitution of an electronic method of measuring the intensity of spectrum lines eliminates the necessity for photographic and developing equipment and an expensive microphotometer, and avoids the errors commonly encountered due to film variation. Girl operators can be trained in a single day to use the instrument efficiently. The entire operation is fully automatic from the time the metal samples are placed in the instrument until the analysis is recorded on paper. Up to 14 elements can be determined simultaneously.

The development of the direct-reading spectrometer will be significant in all metal industries, and in any chemical process where close and constant spectroscopic control is desirable. In melting, alloying and casting of metals it will lower costs by reducing the time a melt must be kept at temperature while waiting for analytical reports. Accuracy is equal or superior to that possible by spectrographic methods.

Electrometric Titration

Precision Scientific Co., 1750 North Springfield Ave., Chicago 47, Ill., is now offering a new titrometer, which accurately determines the free and combined acidity of material in either aqueous or non-aqueous highly colored or opaque solutions. This eliminates the uncertain and inadequate color indicators. The instrument was originated by the Shell Development laboratories primarily for determining the acidity of highly complex mixtures of lubricating oils, either completely opaque or so dark in color that the routine acidimetric color titrations could not be made.

The potentiometer method is reliable and reproducible, and the titration medium is capable of dispersing or dissolving sufficient quantities of the water insoluble materials under test.

When determining the acidity in complex mixtures the Precision "Shell" dual titrometer is also an aid in identifying the acidic constituents of the mixture, and in addition, it furnishes a record of possible changes taking place during sample analyses.

The titrometer has been found suitable

for conducting A.S.T.M. Proposed Method of Test for Saponification Number of Petroleum Products by Electronic Titration and also for A.S.T.M. Tentative Method D-664, "Neutralization Number of Petroleum Products by Electrometric Titration."

Column Packing

Penn State helices. Made of stainless steel, three thirty-seconds of an inch in diameter. These helices are used as packing material in fractionating columns in Hercules Powder Company laboratories

(Continued from page 278)

synthetic rubber known as GR-S-10. Laboratory examination has indicated its possible use in other emulsion polymerization systems where improved reaction cycles and polymer properties are desired. Hercules Powder Co.

DRESINOLS

Sodium and ammonium dispersions of modified rosins and special resin acids containing 40 to 45% solids. These emulsions offer a wide variety of film properties, featuring good water resistance combined with expected resinous characteristics. They may be modified or compounded with other emulsions. Dresinols are being employed in resin-type adhesives, in dextrine type adhesives, in synthetic latex adhesive formulations, specialty textile sizings, crayon coatings, as binders and stickers for fibrous and other materials. Hercules Powder Co.

DRIOCEL

An activated bauxite desiccant which absorbs up to 20% of water by weight. Weight, 55-60 pounds per cubic foot. Non-water sol. Neutral. Inert. Reactivated by heating to 350°-400°F. Used to dry industrial gases and liquids of all kinds, including hydrocarbons and air. Available in commercial tonnages. A special grade, Driocel Packaging Desiccant, meets U. S. Government Specifications and is put up in various sized lined Jean cloth bags for use in moisture-proof packaging (Method II) of supplies to prevent corrosion and other moisture effects during prolonged storage and shipment, particularly overseas. Attapulgus Clay Co.

ERUSTO SOLVENT

(Paint, Oil and Grease Remover)

A spot remover designed for use in laundry or wet cleaning operations. It can be completely removed by washing or rinsing in water. Suggested uses: For removing paint, oil, grease and other obstinate stains from fabrics. Packaged in 1 gallon cans. Pennsylvania Salt Mfg. Co.

EXAN

A synthetic vegetable tan which gives a very fine smooth grain. Leathers tanned with Exan are tight, firm and pliable with excellent resistance to abrasion, water and wear. Because of its light color, Exan is suitable for light leather or pastel shades. Exan is especially effective as a retan agent for chrome tanned leather. Compatible in all proportions with natural vegetable extracts and penetrates leather more rapidly than most vegetable tans. Form, 50% solids dispersion, 26-28% tans. Supplied in 50 gal. barrels and 5 gal. and 10 gal. kegs. Availability: Commercial quantities. Monsanto Chemical Company.

GENERON 101

A low-boiling organic liquid having excellent properties as an aerosol dispersant used alone or in admixture with other dispersant materials. Vapor pressure is 45 lbs./sq. in. (absolute) at 70°F, 115 lbs./sq. in. (absolute) at 130°F; Sp. Gr., 1.19 at —10°C; Specific Heat, 0.29 cal/g at —10°C; Heat of Vaporization, 53.25 cal/g at the boiling point. Generon 101 is compatible with other ingredients commonly used in aerosol insecticides. General Chemical Co.

GENERON 102

A low-boiling, non-inflammable, non-toxic organic liquid having excellent possibilities as an aerosol dispersant used alone or in admixture with other propellant materials. Vapor pressure is 65 lbs./sq. in. absolute at 70°F, 150 lbs./sq. in. at 130°F; Sp. Gr., 1.37 at 70°F. Generon 102 is compatible with the other ingredients commonly used in aerosol insecticides. General Chemical Co.

INDOR INSECT SPRAY

A liquid spray containing 5% DDT and other insecticidal ingredients. This product is recommended for use as a contact and a residual spray for killing the usual insects such as flies, mosquitoes, ants, and roaches, normally infesting dairies, restaurants, and other commercial and industrial food establishments. It is available only in 5, 15, 30 and 55 gallon nonreturnable drums. Pennsylvania Salt Mfg. Co.

MAGNESOL, GRANULAR DESICCANT

A synthetic magnesium silicate possessing a high capacity for the adsorption of water—easily regenerated, neutral and stable, insoluble in organic liquids, does not become wet upon exhaustion nor shrink, expand or disintegrate upon absorption of water. Suggested uses: Drying of gases, liquids and solids; catalyst and catalyst supporting agent. Westvaco Chlorine Products Corp.

MAGNESOL, GRANULAR PERCOLANT

A synthetic magnesium silicate having a high affinity for polar compounds. Regeneration is accomplished by the use of a selected polar solvent. Available in 30-60 mesh size. Suggested uses: For filtration decolorization of oils and like materials; absorption from solution of many polar compounds with subsequent reclamation. Westvaco Chlorine Products Corp.

MUSC ZIBATA*

Mixture of cyclic ketones. Average Mol. Wt., 238. Sample consists of 1% solution in alcohol. B. P., 130°-140°, 1 mm Hg; Congealing Point, about 20° C. Color, water white; odor, musk. Chemical properties: typical properties of saturated cyclic ketone. Suggested uses: fixative for perfumes. Available from 1 oz. to 1 lb. Givaudan-Delawanna Inc.

NYLON MOLDING POWDER FM-1

(Revised)

Sp. Gr., 1.14. M. P., 505°F. Basic color, light cream. A nylon injection molding composition which is outstanding in toughness and high resistance to temperature. Can be molded into thin sections which have a high degree of toughness. It is resistant to esters, alkalies, alcohols, common solvents and weak acids; nonreistant to phenols, formic acid and concentrated mineral acids. Suggested use: Heat resistant injection molded parts. E. I. du Pont de Nemours & Co., Inc.

NYLON MOLDING POWDER FM-3

Sp. Gr., 1.09. M. P., 455°F. Basic color, translucent cream. A nylon injection molding and extrusion composition. Outstanding in heat resistance, chemical resistance and toughness. Can be molded into thin sections which have a high degree of toughness. Resistant to esters, ketones, alkalies, alcohols, common solvents and weak acids. Non-resistant to phenols, formic acid and concentrated mineral acids. Suggested use: Wire covering, injection. E. I. du Pont de Nemours & Co., Inc.

NYLON MOLDING POWDER FM-100

Sp. Gr., 1.10. M. P., 356°F. Basic color, light straw to water-white. A nylon composition for injection molding, calendering, and working in solution. It is outstanding for gasoline resistance and workability, and is resistant to ketones, alkalies, esters. Not resistant to alcohols, methylene chloride, trichlorethane, trichloroethylene, phenols, formic acid, acids. Suggested use: Tubing, wire covering, sheeting, tough moldings for repeated impact. E. I. du Pont de Nemours & Co., Inc.

NYLON MOLDING POWDER FM-101

Sp. Gr., 1.12. M. P., 320°F. Basic color, pale straw to water-white. A nylon plastic composition which can be used in calendering, solution, for compression and injection molding and extrusion. It is outstanding for its gasoline resistance and workability. Resistant to ketones, alkalies, and esters; non-resistant to alcohols, methylene chloride, trichloroethane, trichloroethylene, phenols, formic acid, and acids. Suggested use: Tubing, sheeting, wire covering, gasketing, tough moldings. E. I. du Pont de Nemours & Co., Inc.

NYLON MOLDING POWDER FM-105

Sp. Gr., 1.08. Basic color, light straw. A nylon plastic composition which is outstanding for toughness and in resistance to heat, abrasion, oil and gasoline. Can be injection molded or extruded. Resistant to ketones, alkalies, and esters; non-resistant to alcohols, methylene chloride, trichloroethane, trichloroethylene, formic acid and acids. Suggested use: Wire covering. E. I. du Pont de Nemours & Co., Inc.

PENCO DB-50

A dust base concentrate of DDT for use in the manufacture of insecticidal dusts. This product is especially designed for large scale application, after adequate dilution with inert ingredients, to commercial farm crops. It is applied after dilution directly to the plant foliage. It is available in 50 and 100 lb. fiberpak drums. Pennsylvania Salt Mfg. Co.

PENSAL B

A further improved colloidal type break powder and detergent for use by commercial laundries. This product is recommended for improved whiteness retention and a higher degree of soil removal. Its use results in savings of soap, time, and labor, Pennsylvania Salt Mfg. Co.

PENSALCO LIVESTOCK SPRAY

A product marketed as a dust containing 50% DDT along with other active and inert ingredients for use in the control of many insects which infest livestock. The product is applied by spraying the livestock with a water suspension or by dipping the livestock in a water suspension. It is designed to penetrate beneath the hair and to give a residual killing effect to insects over a period of several weeks. The product is packaged in 4 lb. paper bags. Pennsylvania Salt Mfg. Co.

* Trade mark reg. U. S. Pat. Off.

PENNSALT EC-12A

A ready to use solvent emulsion cleaner for use in high pressure washing machines where emphasis is placed on the need for rust inhibition—designed to remove grease and oil from metal surfaces—a clear light amber colored, free flowing liquid, packaged in 5 and 50 gallon steel drums. Suggested uses: High pressure washer; precleaning before alkaline electrocleaning and subsequent plating; cleaning before painting. Pennsylvania Salt Mfg. Co.

PENNSALT PM-95

A specially prepared (acid base) cleaning and descaling compound which contains addition agents for surface action and inhibition. Suggested uses: General pickling and metal especially for difficult-to-remove oxides resulting from heat treating or annealing. Packaged in 13 gallon glass carboys. Pennsylvania Salt Mfg. Co.

PENNSALT RI-50

A temporary rust preventing agent used in the form of water solutions containing 2% to 4% of agent prior to painting, enameling, etc. of steel and various metal parts. Suggested uses: Treatment of parts to be protected from rust formation for short periods after alkaline or solvent emulsion cleaning and prior to Bonderizing, Barkerizing, painting or enameling. Useful between machining operations. Material packaged in fiberpak drums containing 25, 100 and 300 lbs. Pennsylvania Salt Mfg. Co.

PENNSALT CLEANER A-22

A light duty soak cleaner for aluminum prior to anodizing, chromatizing and phosphatizing recommended for use on aluminum sheets, aluminum die castings, and other aluminum and aluminum alloy parts. Packaged in non-returnable drums holding 25 lbs. Pennsylvania Salt Mfg. Co.

PERM-ASEPTIC 1101-A

An organic mercurial, germicide-fungicide-antiseptic. Color: Clear solution, very light yellow to water-white. Sp. Gr., 1.0485 @ 20° C. Weight, 8.75 lbs. per gallon. Fr. P., none; viscosity increases with lowering temperatures; at —40° C, it resembles vaseline, no change after return to ordinary temperature. Soluble in water in all proportions; may be incorporated in emulsions, pastes, solutions (for oils use hydrocarbon type 1104-A). Completely stable. Suggested uses: In laundries, hospitals, textiles, paper and leather processing; preserves solutions, resists mold and mildew, renders textiles antiseptic. Perm-Aseptic Process Company.

PLASTICIZER #239

A colorless low-melting solid characterized by low volatility, low water solubility, good boiling water stability and excellent compatibility with cellulose acetate. Sp. Gr., 1.17 at 20°C; Flash Point, 145°C; Fire Point, 175°C; Viscosity (centipoises), 1.25 at 80°C. The molding characteristics of cellulose acetate compositions using this plasticizer are excellent. Available in limited quantities. General Chemical Co.

PLATINIZED ASBESTOS

This catalyst has many potential uses because of the high surface area and the inert nature of the carrier. The material contains 10% platinum. Eimer & Amend.

SKYLAC

A new aircraft dope for use on fabric-covered exterior airplane surfaces, as well as on interior decorative areas. Skylac combines increased weather resistance, high tautening effect and ease of application with good fire resistance. Skylac-doped surfaces do not support combustion under conditions where most aircraft finishes ignite readily. Skylac may be sprayed at normal or elevated temperatures. Its high solids content reduces the number of coats necessary. Availability: Limited commercial quantities. Monsanto Chemical Company.

STATEX

A new furnace carbon black with properties intermediate between previously available furnace carbons and other impingement carbons. Its characteristics are: blue black tone, low oil absorption, and low adsorption of toners and driers. Recommended uses: Paint, tinting black for grays; ink, improves tone and "lay"; carbon paper, improves tone, and miscellaneous, wherever blue black is required. Binney & Smith Co.

UREASE TEST PAPER

This paper has particular usefulness in the hydrolysis of urea for making clinical determinations. The paper is added to the sample and the urease in the paper hydrolyzes any urea present. Ammonia is liberated in an amount equivalent to the urea. Eimer & Amend.

Census Bureau

(*Continued from page 312*)

Bureau is currently working with special committees of the Chemical Market Research Association and the Manufacturing Chemists' Association. This industry-government collaboration is also being applied to the problem of minimizing the volume of reports requested of industry, while providing improved statistical coverage for all important products.

The postwar program of foreign trade statistics was put into full operation in 1945, as described above in the section on Import and Export Statistics. In addition, the Bureau is planning to publish wartime and postwar figures on the method of transportation by which merchandise leaves the country (vessel, air, rail, etc.) showing port-to-port movement for exports by vessel and air, the flag of vessel for shipment by vessel. This shipping or transport statistics program is a new one and should provide much valuable information.

LOCATING AND ORDERING MATERIAL

It should be written in letters of gold that the value of government reports is multiplied many fold by adequate indexing. The accessibility of Census data has been impressively improved by the new guides to the Bureau's publications which have been initiated during the past 15 months. Although Census reports are all issued according to a comprehensive plan, the plan is not always apparent and, particularly in the case of detailed reports, the market researcher may become confused in trying to find out what is available on a particular subject. To meet this problem, the newly established guides will assist in finding information in a wide variety of Census publications.

These useful documents, are all entitled *"Census Publications"* and are issued in three series:

1. Program for the Year (Annual)—an outline of the regular publication program of the Census Bureau in the various subject matter fields. (The first issue will soon be released.)

2. *List of Publications Issued* (Monthly)—a listing of special publications, reports issued in series at irregular intervals, and regular publications issued less frequently than quarterly.

3. *Subject Guide* (Quarterly)—a classified guide to contents of all publications issued during the quarter.

Items 1 and 2 are self-explanatory. The Subject Guide comprehensively covers all of the subject matter fields of the Census Bureau from agriculture to manufacture to population to municipal finance, et al., and lists thousands of subjects from "Absorbent Papers" to "Humidifiers" to "Paranoia" to "State Finances" to "Zinc Yellow." Realizing that even this amount of detail is "somewhat general" the Census Bureau has issued more detailed guides to the reports in specific fields. For example, through a series of 49 tabular indices, the information available from the vast 1940 Census of Housing, the type of detail, and the volume and page where it can be found, is presented.

For years prior to 1945, the finding guide was entitled "Census Bureau Publications".

The market researcher seeking Census figures on the production of commodities should first consult the Subject Guide. Industries and product groups may also be looked up in the "Facts For Industry Index of Publications". Another publication is the *List of Schedules Used for Collecting Data by the Bureau of the Census* 1945. This gives a broad description of the survey work in which the Bureau of the Census is engaged, and includes a listing of the forms used, their identifying numbers or symbols, frequency of the survey, method of canvass, whether complete or sample, number and type of respondents, and publications in which the results appear. In addition to assisting in interpretation of published Census data, these descriptions of the schedules indicate the exact degree of detail available in Census records, making it possible to decide what (non-confidential) information can be requested of the Bureau by special correspondence, for which the procedure is outlined elsewhere. For such study purposes, market researchers may also obtain blank copies of the questionnaires on request to the Bureau.

"Census Publications, Price List 70" issued by the Superintendent of Documents is the best index to the Census of Manufactures and the many available "separates" (reprints) of a few pages each, which are available for all of the 450 industry and commodity groups. This publication shows the status of the Superintendent of Documents stock of each publication. For old Census publications, the earlier issues of Price List 70 should be consulted.

For import and export statistics there are two catalogs, both with the general title "U. S. Foreign Trade Statistical Publications". One list "reports covering the calendar years 1941-44" and another lists the numerous "Monthly reports starting with January 1945". They also present exhaustive alphabetical indexes of imports and exports and indicate which new reports supersede the various old series of mimeographed releases. These catalogs are better understood if studied in connection with Schedule A—"Classification of Imports" and Schedule B—"Classification of Exports" which indicate the scope of each statistical class.

It is best of all to examine Census reports first-hand at Department of Commerce Field Offices, which have full sets of the bound volumes and all current reports, including indexes to the publications. These offices can immediately supply certain reports and expedite the ordering of others. They also give expert advice on selecting reports best suited to the requirements of a given problem.

ORDERING CENSUS REPORTS

In general, bound volumes of the Census publications and their "separates" should be ordered from the Superintendent of Documents, Washington 25, D. C. to whom money orders or checks should be drawn. The "Facts for Industry" reports and, of course, the Census lists of their publications, are free on request to the Census Bureau. The new foreign trade reports, it must be carefully noted, should be ordered from the Census Bureau, with checks made out to Treasurer of the United States. In addition to titles and periods covered, report numbers should be given.

INFORMATION BY SPECIAL ARRANGEMENT

The Census Bureau will supply without charge minor breakdowns of various published figures (if non-confidential). The Bureau can often undertake special tabulations of larger scope which can be arranged for on a fee basis. In fact, a manufacturer can contract for jobs worth up to $50,000, the legal limit.

J. A. Van Swearingen, Industry Division Economist, advises that any of the information appearing on Census of Manufactures schedules can be made available, except, of course, where disclosure of operations of individual establishments is involved. "The special purposes that might be served by such tabulations are almost beyond limit. The most usual requests concern data for special trade groups; for example, the members of a given trade association or special trade areas. The Census Bureau regularly prepares special tabulations of the monthly paint report. Occasional requests are for tabulations which will provide some indication of the relation between production of a given commodity and employment. Such requests usually reflect an effort to delineate an 'industry' or to provide some indication of productivity." The general procedure for obtaining special tabulations is as follows: the Bureau is supplied with a precise statement of the required tabulation, and on the basis of this statement an estimate of the cost is prepared. Advance payment to the

(*Turn to page 331*)

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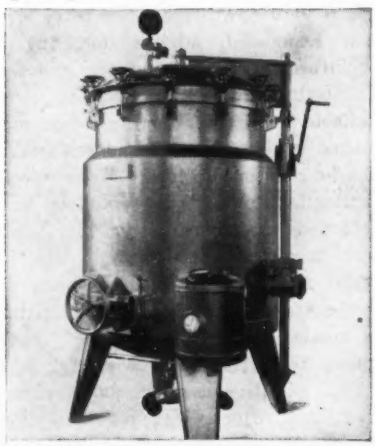

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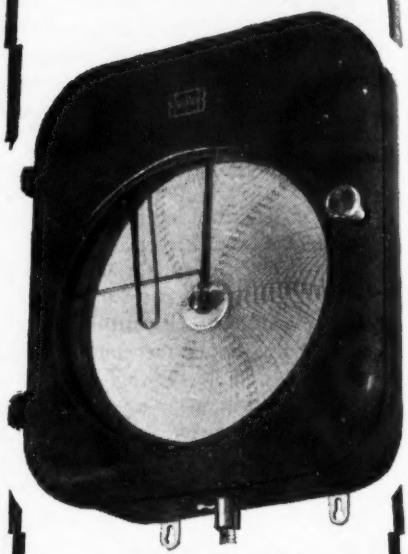

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NEWS OF THE MONTH

Chemical Exposition To Be Held This Month

The 20th Exposition of Chemical Industries, first of the major industrial displays to be held in Grand Central Palace, New York, since Pearl Harbor, will reveal many details of the exploits of the chemical and process industries during the war, and illustrate their extension into new and wider civilian undertakings, according to Manager Charles F. Roth. The Exposition dates are from Feb. 25th through March 2nd, with attendance restricted to those having a business or professional interest in the exhibits.

Significantly, the first Exposition was held in the critical year of 1915 and materially assisted in arousing the interest of industrialists in the establishment and perpetuation of a domestic chemical industry. Today, at the conclusion of a highly industrialized and chemicalized war, while conversion from a wartime to peacetime footing is in its early and formative stage, a unique opportunity is accorded to executives, chemists, and engineers, to study technological advances, many of which are freighted with economic importance and have been restricted to wartime government use.

Some 350 exhibitors have taken space in the four floors of the Palace devoted to the Exposition, and on display will be an entire range of chemicals, processing equipment, and scientific apparatus, of interest not only to the chemical industry as such, but also to the multitudinous chemical consuming industries.

CHEMICAL INDUSTRIES plays its part again by exhibiting "New Chemicals for Industry," which provides a veritable check list of American chemical progress during the war years. Shown for the first time at the 1933 Exposition, "New Chemicals for Industry" has become a recognized institution, and many chemicals which have been introduced to "chemical society" for the first time at the C. I. Booth have since become essential tonnage products. Likewise of the more than 600 recently developed chemicals to be displayed this year, there will be many which in one, two, or five years will be accepted as basic and indispensable by the industry.

The members of the editorial staff of CHEMICAL INDUSTRIES invite you to visit the New Chemicals exhibit, Booth 28, on the main floor of the Palace. They will be delighted to discuss your problems with you and assist in every way possible. A cordial welcome awaits you.

New York Quinine Names McKesson Executive V. P.

Robert I. McKesson has been appointed executive vice-president of the New York Quinine and Chemical Works, Inc. Mr. McKesson rejoined N. Y. Quinine after five years with the 13th Armored Division.

Hydrogen and Synthesis Gases Unit Planned by Govt.

Secretary of the Interior Harold L. Ickes has announced the award of a $249,000 contract to the Girdler Corporation of Louisville, Ky., for designing, erecting, and placing in initial operation a plant for the production of hydrogen and synthesis gases at the new synthetic liquid fuels laboratory now under construction for the Bureau of Mines at Bruceton, Pa.

Under the terms of the contract, the plant is to be completed and ready for operation by August 1, 1946, Secretary Ickes stated. He added that the contract price does not include licenses or immunities under certain patents held by the Hercules Powder Company, the Standard Catalytic Company, and the Girdler Corporation.

The specifications call for a maximum capacity of 110,000 cubic feet of hydrogen and 120,000 cubic feet of synthesis gas daily. These gases are required for investigation of the hydrogenation and gas synthesis processes for producing synthetic oil and gasoline from coal and lignite—processes which will be adapted to American raw materials at the laboratory.

After technical problems are solved by research and development work there, the processes will be tested on a commercial scale at Louisiana, Mo., where the Bureau of Mines recently took over a Government-owned wartime synthetic ammonia plant for conversion into a synthetic fuels demonstration plant. Thus, a pattern will be provided for private enterprise to develop an American synthetic liquid fuels industry to supplement declining reserves of natural petroleum.

Bauer Appointed Sales Manager of H-VW-M

John A. Bauer has been named sales manager of Hanson-Van Winkle-Munning Co., Matawan, N. J., after serving in the company's Pittsburgh, Philadelphia and New York offices.

S. P. A. Recommends Disposal of Nitrogen and Alcohol Units

The Surplus Property Administration's report on the disposal of nine synthetic ammonia plants, submitted to Congress indicated that Government-owned synthetic ammonia war plants could be disposed of in such a manner that 250,000 tons of nitrogen could be produced yearly.

This amount, added to the 50,000-ton output of the T. V. A., would meet the Department of Agriculture goal for fertilizer requirements.

Ammonium nitrate is being produced at the rate of about 100,000 tons a year in five ammunition loading plants. This is the result of the coordination of the disposal of ammonium nitrate graining facilities and nitric acid facilities with the disposal of separately situated synthetic ammonia plants, the report said.

The Agriculture Department proposes that the alcohol plants at Omaha, Neb.,

and Muscatine, Ia., be adapted to the production of glucose and high protein feed at a cost of $220,000 and $40,000 respectively, and that the ammonia plant at Lake Charles, La., be adapted to the production of nitrate fertilizer at a cost of $1,618,760.

Edwards Forms Company

Frank J. Edwards, who has been engaged in the chemical industry for the past twenty-five years, has formed the Frank J. Edwards Co. for the distribution of industrial chemicals and raw materials. Offices of the new concern are located at 15 William St., New York.

Heyden Buys Jamieson

Further diversification of Heyden Chemical Corporation's interests has been realied by the purchase by Heyden of all the assets of C. E. Jamieson & Co. of Detroit and Windsor, as of Dec. 31, 1945.

Hitherto Heyden's main activities have been in the manufacture of formaldehyde and pentaerythritol and more recent operation of a penicillin producing unit, but the acquisition of Jamieson extends the company's activities into the pharmaceutical field.

Detailed plans as to the future operations of the recently acquired subsidiary have not as yet been revealed by President B. R. Armour.

Destroy Farben Plants In U. S. Zone

The systematic wrecking of that part of the great I. G. Farben chemical combine has reached the point where twenty-one of forty-two of its major manufacturing plants within the United States zone have been either destroyed or offered for reparations, according to Brig. Gen. William H. Draper, director of the economics division of the Office of Military Government.

These figures include all of the montan wax and munitions plants, built by the Third Reich at a cost of 900,000,000 reichsmarks and operated by I. G. Farben, in the United States zone.

Two of these plants already have been destroyed, while the general-purpose equipment in twelve has been assigned to reparations. Once this equipment has been removed all installations directly concerned with the production of war materials will be destroyed.

According to the American figures, 58.55 per cent of the Farben assets are in the Soviet zone, 20.2 in the French zone, 11.50 in the British zone, and 9.75 under U. S. control.

CALENDAR *of* EVENTS

AMERICAN CERAMIC SOCIETY will hold its 48th annual meeting at the Hotel Statler, Buffalo, April 28—May 1.

AMERICAN CHEMICAL SOCIETY, national meeting, Claridge Hotel, Atlantic City, April 8-12.

AMERICAN INSTITUTE OF CHEMICAL ENGINEERS, Hotel Pennsylvania, New York, Feb. 27-28.

AMERICAN INSTITUTE OF MINING AND METALLURGICAL ENGINEERS will celebrate its 75th anniversary at the Waldorf-Astoria, New York, September 16-18, 1946.

AMERICAN OIL CHEMISTS SOCIETY, 37th annual meeting, Roosevelt Hotel, New Orleans, May 15-17.

AMERICAN SOCIETY FOR TESTING MATERIALS will hold the 49th annual meeting in Buffalo, N. Y., June 24 to 28, 1946. The 1946 Spring Meeting will be held in Pittsburgh during the week of February 25 to March 1.

DRUG, CHEMICAL AND ALLIED TRADES section of N. Y. Board of Trade, 20th annual dinner, at the Waldorf-Astoria, March 14.

ELECTROCHEMICAL SOCIETY will hold a national convention in Birmingham, Ala., April 11, 12 and 13, 1946.

INSTITUTE OF FOOD TECHNOLOGISTS, sixth conference, to be held at Statler Hotel, Buffalo, March 18-20.

NATIONAL FARM CHEMURGIC COUNCIL, INC., will hold its deferred 11th annual meeting at the Statler Hotel, St. Louis, Mo., March 18-20, 1946.

NATIONAL PLASTICS EXPOSITION, Grand Central Palace, New York, April 22-27.

PACKAGING EXPOSITION of 1946 will be held in the Public Auditorium, Atlantic City, N. J., April 2 to 5, inclusive, 1946, sponsored by the American Management Association.

PRODUCTS OF TOMORROW EXPOSITION will be held at the Coliseum in Chicago, April 27—May 19, 1946.

TECHNICAL ASSOCIATION OF THE PULP AND PAPER INDUSTRY will hold the national meeting at the Hotel Commodore, New York, during the week of February 24, 1946.

20TH EXPOSITION OF CHEMICAL INDUSTRIES will be held at Grand Central Palace, New York, February 25 through March 2, 1946.

Fischer-Tropsch Data Available

Data on research work by the Kaiser Wilhelm Institut fuer Kohlenforschung, directed along the line of iso-paraffin synthesis, are now available to the public, the Office of the Publication Board has announced.

This information is contained in Report No. 289, available from OPB at 10 cents per copy. The report is one of a series, covering German wartime research on the Fischer-Tropsch process for production of synthetic fuels, that are being released to OPB by the Navy Technical Mission in Europe and the Combined Intelligence Objectives Subcommittee.

Research workers at the Kaiser Wilhelm Institut obtained good yields of iso-paraffins through use of the normal synthesis gas (containing hydrogen and carbon monoxide in approximately 1 : 1 ratio) at 300 atmospheres pressure and 420-450° C., with an alumina-thoria catalyst. Yields of about 120-130 grams of paraffinic constituents, consisting of three or more carbon atoms, per meter of synthesis gas are reported, with iso-paraffins in excess of 90%.

Synthesis of aromatics, at 30 atmosphere pressure and 500° C., also has been studied by the Germans, but poor yields and naphthene side reactions appear to make this process unpromising.

Inferior operations resulted from German use of iron catalysts for the Fischer-Tropsch synthesis. Iron catalysts reportedly were desirable only as a wartime substitute for scarce chromium.

Industrial Research Investments at New High

Public recognition of industrial research has reached a new high level, Earl P. Stevenson, president of Arthur D. Little, Inc., Cambridge, Mass., told stockholders at that company's annual meeting on January 24. Research expenditures by private companies in the United States have risen to about $750,000,000 per year during the war, according to government estimates, and this rate will be increased still further as soon as personnel is available, he said.

Frazier to Supervise U. S. I. Chemicals' Resins

U. S. Industrial Chemicals Inc., has appointed Ralph Frazier to supervise resin activities in the company's Philadelphia and Baltimore division offices, specializing in resin applications to the finishes field.

Goodrich Builds Research Lab

Ground has been broken by the B. F. Goodrich Company for a new and complete research center, with construction to be started shortly, it was announced by John L. Collyer, president, as the company observed its seventy-fifth anniversary.

The new research laboratories will be

erected on a 260-acre tract almost exactly halfway between Akron and Cleveland, near Brecksville. Present plans call for five completely air-conditioned buildings of gray brick. The outstanding characteristic of the new laboratories will be their adaptability for rapid conversion from one type of work to another.

American Cyanamid Plans Rise in Plastics Capacity

American Cyanamid Co. plans to spend more than $2 million in the next year to expand plastic-making facilities at its plant at Wallingford, Conn. The plant was built in 1941 to meet wartime demands for melamine and urea formaldehyde molding materials and resins.

Named Production Manager of Monsanto Phosphates

Herbert F. Weaver has been appointed production manager of Monsanto's Phosphate Division, succeeding Edward A. O'Neal, Jr. Mr. Weaver joined Monsanto in 1929, and was formerly manager of the company's Anniston, Ala. unit.

COMPANIES

Du Pont to Build Toledo Formaldehyde Plant

The Du Pont Company has announced that construction will start in the spring on an addition to its Toledo, O., plant to provide Mid-West users of formaldehyde with a closer source of supply.

The new production unit of the Electrochemicals Department will be erected on the property of the Grasselli Chemicals Department plant at Stickney and Matzinger Roads, north of the city. It is estimated the new plant will cost $1,000,000.

Formaldehyde is a key chemical in the synthetic resin industry. Formerly, users of Du Pont formaldehyde were supplied from Perth Amboy, N. J.

Victor Chemical Issues More Preferred Stock

Shareholders of Victor Chemical Works have approved an amending of the company's articles of incorporation to authorize 100,000 shares of new cumulative preferred stock, $100 par value, 40,000 of which are to be sold in the near future.

Proceeds from the sale will enable the company to construct its new Florida phosphorous unit at a cost of approximately $2.5 million. Another $1 million will be devoted to other manufacturing facilities and $400,000 will be employed as additional working capital to finance increased business, according to August Kochs, president.

Freeport Sulphur Reports 1945 Earnings

Net income of the Freeport Sulphur Company for the year 1945 amounted to $3,349,790 after all charges, including depreciation, depletion, special reserves and reserves for taxes, or $4.19 a share on the 800,000 shares of common stock, according to the company's preliminary report submitted to directors by Langbourne M. Williams, Jr., president.

Hydrocol Process Gas Plant Planned for Texas

Carthage Hydrocol Inc. has been incorporated in Delaware to erect a plant to manufacture gasoline from natural gas under the Hydrocol process.

The initial unit which Hydrocol proposes to build in Brownsville, Texas, will cost $14 million of which approximately half will be financed by an RFC loan.

The plant is being designed by Hydrocarbon Research Inc. for a capacity of 60 million cubic feet of gas per day, and calculated production of 5900 barrels of gasoline and 1100 barrels of diesel and other oils.

Standard-Barber Form Gilsonite Company

Standard Oil of California and Barber Asphalt Co. have formed American Gilsonite Co. as a jointly owned corporation to exploit the Utah-Colorado gilsonite deposits formerly owned by Barber.

This deposit is the world's only known important source of gilsonite useful as a high-melting, asphalt-like component of storage battery cases, etc., and as a potential base for the manufacture of synthetic oil.

Halogen Chemicals Expands

Halogen Chemicals, formerly known as Halogen and Perfume Chemicals, Columbia, S. C., has expanded its facilities for the production of alkyl bromides, special polyhalides, and fluorochlorides, according to Director A. M. Whaley.

Some thirty new chemicals have been added to the company's list of products

recently, including chloro-olefins, polybromides, and alcohols.

New Shell Chemical Offices

Shell Chemical Corporation has opened an eastern division office at 500 Fifth Ave., New York 18, and a district office at 624 S. Michigan Blvd., Chicago 5.

Blaw-Knox Division Renamed

The Baum Boulevard division of the Blaw-Knox Company has been renamed the Chemical Plants division in order to identify itself more closely with the purpose for which it was originally organized. The division was formed in 1939 to design, procure and install various types of process plants.

Solvay Builds Research Lab at Syracuse Plant

The Solvay Process Co., a subsidiary of Allied Chemical & Dye Corp., has announced that it will shortly commence construction of a new research laboratory at Syracuse.

The new laboratory, located within the present plant site at Syracuse, will house the research organization of the alkali division of Solvay.

NOBLE CHEMICAL CO., has opened offices at 600 Noblestown Road, Philadelphia and plans to manufacture chemicals for the paint industry. H. G. Neimayer is general manager of the new concern.

FOOTE MINERAL CO., Philadelphia, has moved its offices from 1609 Summer St. to Germantown Trust Company Building, 10 East Chelten Ave., Philadelphia 44, Pa.

NEWS *of* SUPPLIERS

Oliver United Filters Inc. has announced the appointment of Western Machinery Co., S. A., Mexico D. F. as its agent in Mexico and Central America particularly in connection with sales of filters and pumps.

Stewart A. Huge has been appointed manager of production planning for **Continental Can Co., Inc.**, succeeding L. H. Skougor. William B. Tate has been appointed production control manager of the Memphis plant. Walter F. Reinke has been appointed superintendent and assistant plant manager of the Cameron plant. H. F. Campbell, formerly general line representative in the New Orleans district, has been appointed general line district sales manager with headquarters at Atlanta. H. A. Eggerss, vice president in charge of paper and plastics, Continental Can Company, announces that all operations at the Chicago plastics plant have been discontinued and the equipment moved to Cambridge, Ohio. All plastics operations of the company are now located at Cambridge.

Walter Kidde and Co. has transferred its general sales office from 140 Cedar St., N. Y. C. to 675 Main St., Belleville 9, N. J.

W. S. Rockwell Co., to consolidate the activities of its furnace, valve, and Gehnrich oven divisions, has moved its headquarters to Fairfield, Conn. A New York sales engineering office will be retained at the old address, 50 Church St., N. Y. C.

THE AUSTIN COMPANY, engineers and builders, has announced the appointment of three new vice presidents, Harold A. Anderson of New York, eastern district manager of the company; Charles W. Payne, Jr., Chicago district manager; and Richard Ellis of Seattle, district manager in the Pacific Northwest.

To meet the greatly expanded needs for packaging in Southern California, the BEMIS BRO. BAG CO. is increasing its production of cotton, burlap and open-mesh bags by opening a factory at Los Angeles.

A building 415 feet by 145 feet has been leased at 5401 East Slauson Avenue, Los Angeles and a spur track is being built to permit direct unloading of supplies and shipment of finished products. C. H. Dekker has been appointed manager of this new factory.

PERSONNEL

Althausen Heads Fritzsche New Products Department

Darrell Althausen has joined Fritzsche Brothers, Inc., New York essential oil and aromatic chemical house, and will head the company's new products department with offices and laboratories in the Clifton plant.

Baker Chemical Appoints New Export Manager

G. B. Hafer, general sales manager, announces that Carl Nessler has joined the J. T. Baker Chemical Co. as export manager.

Personnel Notes

Calco Chemical Division, American Cyanamid Company, Bound Brook, New Jersey, has announced the appointment of FLOYD T. RIDLEY to the post of traffic manager.

STEPHEN F. URBAN, previously with the Carnegie-Illinois Steel Co., has been made director of research in charge of all divisions of the research laboratories of The Titanium Alloy Manufacturing Co., Niagara Falls, N. Y. EUGENE WAINER has been made associate director of research.

JOHN C. LEPPART has been appointed assistant to the operating vice-president of the Southern Alkali Corporation, Corpus Christi, Texas, and will make his headquarters in Corpus Christi.

JOHN F. NEILL has been named manager of the New York branch of Merck & Co., Inc. Since his return from service in May 1944, Mr. Neill has been assistant manager of the branch.

RICHARD E. DEAL has been elected a director and secretary of Nitrogen Products, Inc. and its subsidiaries, Benzol Distributors, Inc. and Fertilizer Forwarding Corporation.

JOHN S. G. SHOTWELL, consulting chemist and engineer, has announced the opening of an office at 500 Fifth Avenue, New York 18, N. Y.

CHEMICAL SPECIALTIES NEWS

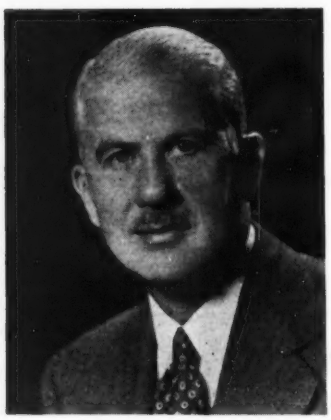
Government Issues DDT Literature Survey

No scientific development—not excepting sulfa drugs, penicillin, or even the atomic bomb up to this time—has resulted in such a sustained flood of factual technical reporting as the discovery and research development of DDT.

The swelling volume of DDT literature comes to a focus in a third list of publications on DDT which has been mimeographed by the U. S. Department of Agriculture as an aid to research workers and technicians interested in DDT. A modest first list of 174 titles covered articles published up to April 30, 1944. This covered the period when DDT was new and much of the information was still regarded as a military secret. Covering the last eight months of 1944, the second list included 418 titles, and the third list for the first half of 1945 lists 381 items. The last half of 1945 has seen active reporting on DDT and the total for 1945 is sure to exceed 1944.

The great majority of the articles have been published in scientific journals covering entomology and medicine, and the technical journals of the chemical industry.

Devine Heads Ink Division Of Sun Chemical Company



John F. Devine has been named president of the General Printing Ink Co. division of Sun Chemical Company. The division comprises eight companies in the printing ink field. Albin K. Schoepf, former head of General Printing Ink, is president of Sun Chemical.

Sterling Drug Sales at New High for 1945

Sterling Drug, Inc., one of the largest makers of trademarked drugs and of ethical drug products, is expected to report earnings for 1945 of slightly over $2.50 a share on its present stock which represents a split of two-for-one in June, 1945. In 1944, the firm reported $4.55 a share on its old stock and it is understood excess profits taxes last year exceeded $5 million.

Sales volume also reached a new high of slightly more than $100 million compared with $68 million in 1944. The reason for this was chiefly the fact that Sterling acquired 50% of the stock of Winthrop Chemical from General Aniline in April, 1945, which gave it 100% ownership of this maker of ethical drugs and sales of Winthrop now are consolidated with those of Sterling .

Gunk Establishes Chicago Plant

Gunk Chicago, is the name of a new chemical plant licensed by the Curran Corporation, Malden, Mass., to process and sell its patented self-emulsifying Gunk solvents, used by automotive and aircraft repair depots for degreasing and decarbonizing .

The new unit, comprised of two modern brick and concrete buildings, is located to serve midwestern jobbers and consumers and to eliminate the necessity of direct shipment from the New England plant.

Manager of the new Chicago concern is Charles J. Dempsey; chief engineer, John Stanley; sales manager, Donald Dempsey.

Niagara Sprayer Builds West Coast Chemical Plant

The Niagara Sprayer and Chemical Co., Inc., subsidiary of Food Machinery Corp., San Jose, California, has begun construction of a $450,000 chemical plant at Richmond, Calif. It is anticipated that the first units, occupying 35,000 square feet, will be completed within 100 working days.

The plant will be devoted to the production of agricultural chemicals, mainly insecticides and fungicides, for the West Coast.

Bradley Heads Kyanize Research

The board of directors of the Boston Varnish Company, manufacturers of Kyanize paints, Everett, Mass., announce, as the first step in a broad program of postwar expansion, the appointment of John J. (Jack) Bradley, Jr., as technical director.

Plans are also said to be under way for the construction of new additions to the plant and for additional facilities and equipment for the proposed enlarged development and research departments.

Raymond Elected Searle Research Vice President

Albert L. Raymond has been appointed vice-president in charge of research of G. D. Searle & Co., Chicago. The appointment heralds further expansion of the company's research program in ethical pharmaceuticals, according to President John G. Searle.

Novel Stainproof Plastic Wall Covering

A stainproof plastic wall covering, to be known as Varlon, will be introduced sometime in July, 1946, by Varlon, Inc., a division of United Wallpaper, Inc., it has been announced by William H. Yates. United president.

The result of nine years' laboratory research and development, the new stainproof wall covering will permit the removal of almost any type of dirt, grease or stain by the simple application of soap and water. The product has been undergoing field tests for the last ten months where it has withstood severe wear and tear in numerous public places, such as government office buildings, restaurants, theatres, hotels, etc.

Field tests have proved that heretofore indelible stains, such as lipstick, hot grease, crayon, ink, etc., require only soap and water for removal.

Interchemical Markets Two New Specialties

Interchemical Corp., Fairlawn, N. J. has recently placed two new specialties, I. C. Degreaser and Dippo silver cleaner on the market, and is completing plans for national distribution through department and hardware stores.

I. C. Degreaser is a liquid solvent and Dippo silver cleaner is being marketed in

Fertilizer Exports And Imports Up

The pronounced rise in exports of fertilizer materials continued in October. Shipments in that month, according to The National Fertilizer Association, totaled 106,000 tons, valued at $1,700,000. This represented increases over October 1944 of 47 percent in tonnage and 79 percent in value.

Total fertilizer exports in January-October 1945 amounted to 787,000 tons, with a stated valuation of $12,827,000. This was an increase of 49,000 tons over the corresponding period of 1944, with a rise in phosphate rock shipments accounting for 47,000 tons. There were sizable increases in shipments of nitrogenous materials and prepared mixtures but they were about offset by the decline in superphosphate exports.

The January-October statistics include exports under the lend-lease program of 156,000 tons, valued at $2,600,000, and shipments for UNRRA of 48,000 tons valued at $326,000.

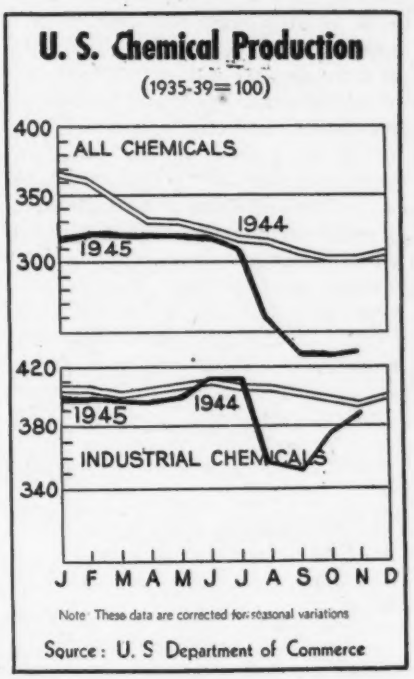
Imports of fertilizer materials in October totaled 92,000 tons, valued at $2,635,000. Ammonium sulphate and calcium cyanamide were imported in larger volume than a year earlier, sodium nitrate imports were at about the same level, and declines took place in other materials. The net result was a 9,000 ton increase in total imports.

Total fertilizer imports in the first 10 months of the year exceeded 1,500,000 tons. Increases over 1944 were 35 percent in tonnage and 30 percent in value. Larger imports of sodium nitrate were responsible for 289,000 tons of the 394,000 ton increase in total imports. Other principal increases were in the other chemical nitrogenates and phosphatic materials (other than bone phosphates). Imports of organics and bone phosphates declined.

Reflecting the fertilizer demand situation in this country, imports in January-October 1945 were practically double exports. In the pre-war years, 1935 through 1939, imports exceeded exports by only 5 percent. Stating it a little differently, imports in 1945 were at the pre-war level while exports were only about half as large as in pre-war.

Industrial Soap Consumption Rises

Statistics on the use of soap for industrial purposes comes from the bulletin on the Fats and Oils Situation, published by the Bureau of Agricultural Economics of the U. S. Department of Agriculture. According to this authority about two



and one half times more soap was used in synthetic rubber, textiles, wire drawing and other industrial processes during 1944 than in pre-war years. This estimate is based on figures showing that this industrial soap accounted for 180 million pounds of fat in 1944 as compared with 75 million pounds a year before the war and 110 million pounds in 1943.

Potash Deliveries High

The total potash delivered in the United States, Canada, Cuba, Puerto Rico and Hawaii during the third quarter of 1945 by the five major American producing companies amounted to 365,530 short tons of potash salts containing an equivalent of 202,091 tons K_2O, according to the American Potash Institute. Agricultural deliveries amounted to 333,109 tons of salts, equivalent to 181,864 tons K_2O, comprised of 270,642 tons muriate of potash, 20,229 tons of manure salts and 42,238 tons of sulphate of potash and sulphate of potash-magnesia. Deliveries to the chemical industry amounted to 32,421 tons of muriate of potash and sulphate of potash, equivalent to 20,227 tons K_2O.

During the first nine months of 1945, total deliveries to United States, Canada, Cuba, Puerto Rico, and Hawaii amounted to 1,187,051 tons of potash salts containing an equivalent of 643,537 tons K_2O. These were an increase of 10.6% in salts and 10.8% in K_2O over the corresponding period in 1944. Potash for agricultural use consisted of 1,076,675 tons of salts equivalent to 574,828 tons of K_2O, representing increases of 10.5% in salts and 10.8% in K_2O. Agricultural salts consisted of 835,454 tons of muriate of potash, 119,011 tons of manure salts, and 122,210 tons of sulphate of potash and sulphate of potash-magnesia. Deliveries

PLASTIC WATER PAINTS, COLD-WATER PAINTS AND CALCIMINES

October 1945
Compared With Preceding Months

The statistics presented in the following table are based on data reported by 38 identical manufacturers who accounted for approximately 87 percent of the total value of plastic texture paints, cold-water paints and calcimines in the United States, as reported in the Biennial Census of Manufactures, 1939. For comparable figures beginning January 1945, and an explanation of certain changes which affect previously published data, see "Facts for Industry," Series M19K-85, released November 12, 1945.

SALES FOR SEPTEMBER AND OCTOBER 1945

Product	*October*	*September*[1]
Plastic-Texture Water Paints, Total:[2]		
Pounds	1,008,756	703,753
Value	$68,096	$48,097
Cold Water Paints, Total Value	$470,214	$450,913
Interior, total value	$258,832	$292,802
Casein and other protein bound:		
Paste and semipaste form—		
Gallons	147,445	191,576
Value	$189,531	$243,214
Dry powder form—		
Pounds	736,027	500,485
Value	$57,877	$41,501
Glue bound—		
Pounds	274,562	182,763
Value	$11,424	$8,087
Exterior, total value	$211,382	$158,111
Casein and other protein bound:		
Pounds	322,733	170,824
Value	$20,054	$10,494
Lime and/orcement bound—		
Pounds	2,476,621	1,909,922
Value	$191,328	$147,617
Calcimines, Total:		
Pounds	1,672,320	1,930,348
Value	$78,039	$90,332
Hot water—		
Pounds	640,477	832,095
Value	$27,908	$36,515
Cold-water—		
Pounds	1,031,843	1,098,253
Value	$50,131	$53,817

[1] Revised.
[2] Includes Paste and Dry Powder Plastic-Texture Water Paints which cannot be shown separately without disclosing operations of individual companies.

to the chemical industry amounted to 110,376 tons of muriate of potash and sulphate of potash, equivalent to 68,709 tons K_2O, representing increases of 11.1% in salts and K_2O over the first three quarters in 1944.

Sulphur Stocks Ample for 1946

In spite of the drain of four war years during which shipping and production were maintained up to record-breaking levels, the American sulphur industry today stands ready with stocks and facilities sufficient to supply all anticipated demands during 1946.

Shipments from Gulf Coast mines during the year were estimated at 3,800,000 long tons, as against 3,500,000 long tons last year, a new all-time peak. Production also climbed to new highs. By August, the month of the war's end, more native sulphur was being produced than in any previous month in the history of the industry and production for the entire year was approximately 3,750,000 long tons, as compared to about 3,200,000 for the year 1944. Stocks on hand at mines today amount to around 3,500,000 long tons.

Consumption of American sulphur in 1946 may well continue at high levels, with markets both at home and abroad. An examination of domestic industries which are sulphur consumers, indicates that there will be no large decrease in demand, assuming no general industrial let down.

By far the largest proportion of sulphur shipments are made to the sulphuric acid industry. At the close of 1945 the sulphuric acid production capacity of this country was 10,500,000 short tons, 100 per cent acid, an increase of more than a million tons over 1944 and of more than two million tons during the war.

Although the major portion of this increase went into the manufacture of explosives, this does not mean a corresponding drop in sulphuric acid consumption with the closing of explosive plants. Ingenious salvage and reuse of the acid, employed first in explosive plants, has helped to hold expansion of sulphuric acid capacity within limits which the industry should be able to utilize in peacetime production. Fresh acid will now be supplied direct to peacetime industries instead of being routed first through explosive plants.

War-born expansion of such industries as the rayon, petroleum, steel and fertilizer manufacture, all sulphuric acid consumers, also is not expected to drop to prewar levels; first, because of the great bank of civilian orders and second, because of new developments in these fields which increase their use of acid. Other industries, prevented from full growth during the war, are also expected to need additional sulphuric acid to fill long-delayed projects.

Significant to the postwar outlook of the sulphur industry is the anticipated demand for sulphuric acid from superphosphate fertilizer manufacturers. About 6,800,000 tons of superphosphates were produced in 1945, and Department of Agriculture figures show an increase in general farm use of fertilizer ranging from 100 to 367 per cent over prewar years.

Refertilization and conditioning of European farms to supply even a portion of the minimum food needs will also require large shipments of fertilizer.

Allied to the fertilizer industry in catering to the food needs of the world is the manufacture of fungicides and insecticides, for which sulphur is a base.

Experiments in the use of sulphuric acid in the production of high octane gasoline, diverted to large degree to aviation during the war, show that this process may now be extended to improve automobile and other motor fuels.

Sulphur will continue to be in demand for the vulcanization of rubber, whether natural or synthetic. During 1945, production of synthetic rubber, in which sulphuric acid is used for several stages, was estimated at about 1,000,000 tons, and a projected total of 1,200,000 tons has been set for 1946.

Consumption of sulphur in the paper industry is estimated to average about 354,000 tons annually, about 10 per cent of total sulphur production. Expected expansion of the industry, held in check by war requirements, may send this amount up during 1946.

PRODUCTION, MINE SHIPMENTS, APPARENT SALES, AND PRODUCERS' STOCKS OF NATIVE SULFUR IN THE UNITED STATES IN SELECTED PERIODS, 1944-45, IN LONG TONS.

Period	*Production*	*Mine shipments*	*Apparent sales**	*Producers' stocks***
October 1945	348,365	220,131	172,148	3,858,728
September 1945	341,060	256,317	369,860	3,682,511
October 1944	312,060	333,329	342,641	4,110,395
September 1944	293,963	327,155	313,999	4,140,976
Monthly average 1945 (10 mo.)	309,761	339,722	333,920	.....
Monthly average 1944 (10 mo.)	268,180	293,249	298,338	.....

* Calculated from production and change in stocks during the period.
** Producers' stocks at mines, in transit, and in warehouses at end of period.

Lead Output Shows Little Change in October

Lead production (in terms of recoverable metal) from domestic mines was 29,816 short tons in October 1945, an increase of 286 tons over the September output, according to preliminary estimates of the Bureau of Mines, United States Department of the Interior.

PRODUCTION, CONSUMPTION, AND STOCKS OF SYNTHETIC ORGANIC CHEMICALS IN THE UNITED STATES, AUGUST AND SEPTEMBER, 1945

The data given in the following table supplement the figures released beginning March 1, 1944, in the Facts for Industry Series 6-2-1 to 6-2-21. Information concerning the limitations of the data, the completeness of coverage, and the selection of items were given in the Series 6-2-1 report.

In the table, production (except as noted in footnote 10) includes material produced whether consumed in the producing plants or sold. Consumption represents consumption at producing plants only; it includes material produced in such plants, or material purchased or transferred from other plants. Stocks are company stocks, as of the last day of the year or month, located at plant, in transit, or in warehouse, and include purchased as well as produced material. (In pounds, except that creosote oil is expressed in gallons.)

Item	*August*	*September*
Acetanilide (technical and U.S.P.):		
Production	603,560	520,903
Consumption	[4]	[4]
Stocks	231,955	252,378
Acetic acid (synthetic):[1]		
Production	21,271,109	18,373,451
Consumption	16,186,024	16,219,159
Stocks	8,573,469	10,427,764
Acetic acid (natural, including that from calcium acetate):[2]		
Production	2,551,009	2,438,893
Consumption	[4]	[4]
Stocks	2,310,227	3,099,512
Acetic anhydride:[3]		
Production	42,728,754	37,789,450
Consumption	28,566,970	31,040,737
Stocks	[4]	10,161,955
Acetylsalicylic acid (Aspirin):		
Production	814,794	961,996
Consumption	[4]	[4]
Stocks	1,113,309	1,215,843
n-Butyl acetate:		
Production	6,444,972	4,009,395
Consumption	[4]	[4]
Stocks	3,774,675	3,154,324
Creosote oil, tar distillers:[6]		
Production	9,296,172	9,800,002
Consumption	562,847	547,723
Stocks	5,801,398	5,518,356
Creosote oil, byproduct:[6]		
Production	2,822,208	2,398,293
Consumption	15,166	28,518
Stocks	894,304	857,277
Cresols, meta-para:[7]		
Production	912,578	937,129
Consumption	[4]	[4]
Stocks	354,037	416,729
Cresols, ortho-meta-para:[7]		
Production	695,690	866,487
Consumption	.....	.....
Stocks	61,546	[4]
Cresylic acid, crude:		
Production	2,104,510	2,147,513
Consumption	[4]	[4]
Stocks	1,055,332	899,011
Cresylic acid, refined:[7]		
Production	2,539,407	2,430,999
Consumption	[4]	[4]
Stocks	1,168,466	1,441,139
Diethyl ether (all grades):		
Production	5,439,336	4,487,628
Consumption	[4]	[4]
Stocks	2,964,669	3,184,971
Ethyl acetate (85 per cent):		
Production	10,970,046	6,849,223
Consumption	1,570,204	1,806,752
Stocks	7,042,032	8,554,488
Lactic acid (edible):		
Production	Published	[5]1,240,514
Consumption	quarterly	[4]
Stocks		[4]
Lactic acid (technical):		
Production	Published	[5]723,690
Consumption	quarterly	[5]230,431
Stocks		506,256
Methyl chloride (all grades):		
Production	2,383,609	2,251,734
Consumption	[4]	[4]
Stocks	662,484	528,064
Naphthalene, less than 79° C. (coke-oven operators):[9]		
Production	7,242,143	7,632,973
Consumption	.....	.....
Stocks	2,176,575	2,428,643
Naphthalene, less than 79° C. (tar distillers):[10]		
Production[11]	17,730,597	20,252,928
Consumption	[4]	10,118,796
Stocks	6,720,651	5,803,146
Naphthalene, refined (79°C. and over):		
Production	5,574,731	7,772,986
Consumption	3,310,287	3,750,481
Stocks	1,972,763	2,510,376

Oxalic acid (technical):		
Production	1,650,707	1,521,577
Consumption	[4]	[4]
Stocks	459,883	349,757
Phenobarbital and sodium salts:		
Production	15,264	22,989
Consumption	[4]	[4]
Stocks	25,619	28,182
Phthalic anhydrides:		
Production	11,283,743	9,567,194
Consumption	2,526,403	1,849,306
Stocks	3,130,630	5,163,096
Riboflavin (for human use):		
Production	6,722	5,317
Consumption	[4]	2,357
Stocks	16,314	11,925
Sulfa drugs (total):[12]		
Production	459,565	462,333
Consumption	[4]	[4]
Stocks	549,569	588,491

[1] Excludes statistics on recovered acetic acid.
[2] Natural acetic acid (produced by direct process from wood) and acetic acid distilled from calcium acetate. These statistics are collected and compiled by the U. S. Bureau of the Census.
[3] Represents all acetic anhydride, including that produced from acetic acid by the vaporphase process.
[4] Confidential; publication would disclose operations of individual companies.
[5] Product of distillers who use purchased coal tar only.
[6] Product of byproduct coke-oven operators only. These statistics are collected and compiled by the Coal Economics Division, U. S. Bureau of Mines.
[7] Statistics represent total production, consumption and stocks, including both data reported by coke-oven operators to the Coal Economics Division, Bureau of Mines, and data reported by distillers of purchased coal tar to the U. S. Tariff Commission. Data reported to the two agencies are combined to prevent the disclosure of the operations of individual companies.
[8] Three months total (July-September.)
[9] Includes only the production, consumption and stocks of coke-oven operators. Statistics combine the three grades (solidifying at less than 74° C., at 74° C. to less than 76° C., and at 76° C. to less than 79° C.) in order to prevent the disclosure of the operations of individual companies. These statistics are collected and compiled by the Coal Economics Division, Bureau of Mines.
[10] Includes only the production, consumption and stocks of distillers of purchased coal tar. Statistics combine the grades specified in footnote 8, in order to prevent the disclosure of the operations of individual companies.
[11] For the grade solidifying at less than 74° C., these statistics represent production for sale only; for the other two grades, they represent production both for consumption within the producing plant and for sale. Production for consumption of the grade solidifying at less than 74° C. is excluded in order to minimize duplication as this grade is frequently converted to grades of higher melting point.
[12] Includes acetylsulfathiazole produced both as a sulfa drug and as an intermediate, resulting in an appreciable duplication which is unavoidable.
Source: Statistics collected and compiled by the U. S. Tariff Commission, except where otherwise noted.
(Refer all inquiries concerning these data to the United States Tariff Commission, Washington 25, D. C.)

Lead Scrap Consumption Rises

Smelters' receipts and consumption of lead-base scrap and residues rose to new heights during October and culminated in the highest recovery of secondary metal yet recorded according to the Bureau of Mines, United States Department of the Interior.

A 9 percent gain over September brought smelters' purchases for the month up to 46,561 tons and a 15 percent increase in scrap used raised the consumption figure to 45,384 tons. Secondary lead, tin, and antimony reclaimed totaled 36,174 tons—2,867 tons above the previous high of 33,307 tons recovered in May of this year.

The most important development of the month regarding control over lead was the issuance of Direction 5 to Priorities Regulation No. 32, prohibiting dealers

CHEMICALS: UNITED STATES PRODUCTION, CONSUMPTION, AND STOCKS, AUGUST AND SEPTEMBER, 1945

Statistics on the production, consumption and stocks of chemicals shown in the following table supplement the 1941-1943 figures released February 7, 1944, in "Facts for Industry," Series 6-1-1. Figures for earlier months, information on the number of plants manufacturing each chemical, and a discussion of the limitations of the data are given in the above-mentioned publication. The production figures represent primary production and do not include purchased or transferred material. The consumption statistics are for consumption only in the plants where each chemical is produced. The stocks figures represent the quantities of each chemical on hand at the end of the month at producing locations only.

		September (Preliminary)			*August (Revised)*		
Chemical and Basis	*Unit*	*Production*	*Consumption in producing plants*	*Stocks at producing plants, end of month*	*Production*	*Consumption in producing plants*	*Stocks at producing plants end of month*
Acetylene:							
For use in chemical synthesis	M cu. ft.	205,784	50,116	9,853	278,046	67,599	10,207
For commercial purposes	M cu. ft.	88,348			104,204		
Aluminum chloride:							
Anhydrous and crystal (100% $AlCl_3$)	M pounds	3,149	(1)	2,015	4,391	(1)	1,857
Solution (32° Be')	M pounds	780	....	466	988	....	384
Aluminum sulfate:							
Commercial (100% $Al_2(SO_4)_3$)	M pounds	(2)	(2)	(2)	(2)	(2)	(2)
Iron free (100% $Al_2(SO_4)_3$)	M pounds	(2)	(2)	(2)	(2)	(2)	(2)
Synthetic anhydrous ammonia (100% NH_3)[3]	Short tons	42,685	35,107	5,980	46,787	34,429	6,709
Ammonium chloride (100% NH_4Cl)	M pounds	5,399	....	2,361	5,953	....	1,735
Barium sulfate (Blanc fixe') (100% Ba SO_4)	M pounds	5,646	4,091	5,639	3,049	1,834	5,875
Bleaching powder (35-37% Available Cl$_2$)	M pounds	1,083	....	782	1,699	....	1,061
Calcium acetate (80% $Ca(C_2H_3O_2)_2$)	M pounds	566	....	106	730	....	117
Calcium arsenate (100% $Ca_3(AsO_4)_2$)	M pounds	906	72	12,777	2,227	212	12,710
Calcium carbide (Commercial)	Short tons	45,384	(4)	41,643	55,090	(4)	34,099
Calcium hypochlorite (true) (70% Available Cl$_2$)	M pounds	567	(1)	446	1,281	(1)	690
Calcium phosphate:							
Monobasic (100% $CaH_4(PO_4)_2$)	M pounds	4,747	(1)	3,971	4,525	(1)	3,590
Dibasic (100% $CaHPO_4$)	M pounds	5,873	(1)	820	5,110	(1)	1,036
Carbon, activated	M pounds	5,275	(1)	6,966	5,026	(1)	6,046
Carbon black (Channel):							
Rubber grade	M pounds	45,548	....	43,066	45,954	....	28,520
Other than rubber grade	M pounds	3,068	....	9,131	2,786	....	9,858
Carbon dioxide:							
Liquid and gas[5]	M pounds	16,454	2,676	2,261	19,708	2,667	2,079
Solid (dry ice)	M pounds	62,764	....	12,877	68,858	....	11,658
Chlorine	Short tons	89,600	46,938	6,387	*97,659	*55,912	*6,499
Chrome green (C. P.)	M pounds	902	71	793	500	38	*791
Chrome yellow and orange (C. P.)	M pounds	3,861	265	2,231	*3,275	257	*1,879
Copper acetoarsenite (Paris green)	M pounds	156	(1)	827	149	(1)	738
Hydrochloric acid (100% HCl)	Short tons	30,552	19,244	3,376	*33,839	*21,983	*2,848
Hydrogen	Millions of cubic feet	1,573	1,237	(4)	1,914	1,583	(4)
Hydrogen peroxide (100 volumes)	M pounds	2,659	29	1,340	2,651	43	1,028
Lamp black	M pounds	1,149	(1)	1,030	1,219	(1)	540
Lead arsenate (acid and basic)	M pounds	2,313	138	13,737	4,723	85	14,048
Iron blue (C.P.)	M pounds	773	124	907	*698	*83	*871
Lead oxide:							
Red (C. P.)	M pounds	7,275	255	6,465	8,253	326	5,550
Yellow (C. P.)	M pounds	30,263	7,003	13,043	29,511	8,242	11,123
Methanol:							
Natural (100% CH_3OH)	M gallons	194	(4)	283	238	(4)	360
Synthetic (100% CH_3OH)	M gallons	6,112	(1)	8,340	6,169	(1)	6,851
Molybdate chrome orange (C. P.)	M pounds	218	(1)	99	146	(1)	88
Nitric acid (100% HNO_3)	Short tons	32,025	27,952	5,968	37,088	31,993	6,259
Nitrous oxide	M gallons S. T. P.	(2)	....	(2)	(2)	....	(2)
Oxygen	M cu. ft.	890,436	26,700	(6)	977,548	27,629	(6)
Phosphoric acid (50% H_3PO_4)	Short tons	63,809	57,731	12,102	57,952	55,136	12,838
Potassium bichromate and chromate (100%)	M pounds	491	....	231	447	....	240
Potassium hydroxide (caustic potash) (100% KOH)	Short tons	4,532	730	3,809	4,665	769	3,159
Soda ash (Commercial sodium carbonate):							
Ammonia soda process—							
Total wet and dry (98-100% Na_2CO_3)[7]	Short tons	333,453	....	....	363,802	....	....
Finished light (98-100% Na_2CO_3)[8]	Short tons	160,528	44,310	23,549	188,086	51,650	22,520
Finished dense (98-100% Na_2CO_3)	Short tons	121,594	2,149	14,073	120,680	3,739	10,493
Natural[9]	Short tons	14,750	....	2,505	15,865	....	2,843
Sodium bicarbonate (refined) (100% $NaHCO_3$)	Short tons	13,846	(1)	2,857	14,593	(1)	3,787
Sodium bichromate and chromate (100%)	Short tons	6,561	(1)	846	6,537	(1)	942
Sodium bisulfite (100% $NaHSO_3$)	M pounds	2,687	(1)	943	3,326	(1)	757
Sodium hydrosulfide (100% NaSH)	M pounds	1,940	(1)	647	2,250	(1)	684
Sodium hydrosulfite (100% $Na_2S_2O_4$)	M pounds	3,115	(1)	1,439	2,767	(1)	944

(cont. on page 328)

CHEMICALS: UNITED STATES PRODUCTION, CONSUMPTION, AND STOCKS, AUGUST AND SEPTEMBER, 1945 (*Cont'd*)

Chemical and Basis	*Unit*	*September (Preliminary)* Production	Consumption in producing plants	Stocks at producing plants, end of month	*August (Revised)* Production	Consumption in producing plants	Stocks at producing plants, end of month
Sodium hydroxide (caustic soda):[10]							
Electrolytic process—							
Liquid (100% NaOH)	Short tons	85,323			92,057		
Solid (100% NaOH)	Short tons	14,966			17,786		
Lime-soda process—			26,614	55,616		29,664	52,733
Liquid (100% NaOH)	Short tons	54,646			60,261		
Solid (100% NaOH)	Short tons	18,929			19,947		
Sodium phosphate:							
Monobasic (100% NaH_2PO_4)	Short tons	1,003	(1)	212	1,336	(1)	228
Dibasic (100% Na_2HPO_4)	Short tons	5,014	(1)	524	5,574	(1)	839
Tribasic (100% Na_3PO_4)	Short tons	7,296	283	1,314	7,637	222	1,302
Meta (100% $NaPO_3$)	Short tons	2,299	(1)	377	2,227	(1)	271
Tetra (100% $Na_4P_2O_7$)	Short tons	3,812	107	525	3,905	147	1,037
Sodium silicate:							
Soluble silicate glass, liquid and solid (anhydrous)	Short tons	24,864	3,010	51,728	34,806	*3,093	*54,980
Sodium sulfate:							
Anhydrous (refined) (100% Na_2SO_4)	Short tons	6,691	(1)	(1)	5,717	(1)	(1)
Glauber's salt (100% $Na_2SO_4 \cdot 10H_2O$)	Short tons	13,780	(1)	2,262	12,490	(1)	2,906
Salt cake (crude) (commercial)[9]	Short tons	43,598	4,836	56,235	48,974	4,663	58,610
Sulfur dioxide	M pounds	5,996	3,117	2,682	5,756	2,796	2,389
Sulfuric acid:[9]							
Total (100% H_2SO_4)	Short tons	677,596			783,209		
Chamber process (100% H_2SO_4)	Short tons	248,657	....		260,756	....	
Contact process (100% H_2SO_4)[11]	Short tons	428,939	....	305,208	522,453	....	280,574
Net, contact process (100% H_2SO_4)[11 12]	Short tons	394,160	....		469,438	....	
White lead:							
Basic lead carbonate (C. P.)	Short tons	4,264	2,150	1,517	3,266	1,449	2,293
Basic lead sulfate (C. P.)	Short tons	1,052	....	286	1,028	....	173
Zinc yellow (zinc chromate) (C. P.)	Short tons	512	(1)	536	1,159	(1)	571

[1] Data cannot be published without disclosing operations of individual establishments.
[2] Not yet available.
[3] Data for a small amount of aqua ammonia are included in the figures reported by one company.
[4] Not available; see "Facts for Industry," Series 6-1-1.
[5] Revised figures for earlier months will be shown in a subsequent release of this series.
[6] Data for oxygen stocks are no longer collected.
[7] Total wet and dry production, including quantities diverted for manufacture of caustic soda and sodium bicarbonate, and quantities processed to finished light and finished dense soda ash. For detailed discussion of soda ash statistics, see "Fact for Industry," Series 6-1-1.
[8] Not including quantities converted to finished dense soda ash.
[9] Natural soda ash, crude salt cake and sulfuric acid data collected with Bureau of Mines.
[10] Production figures represent total production of liquid material, including quantities evaporated to solid caustic and reported as such. Consumption figures represent quantities of both liquid and solid caustic consumed in producing plants exclusive of quantities of liquid caustic evaporated to solid. Stock figures include quantities on hand of liquid and solid material.
[11] Includes sulfuric acid of oleum grades.
[12] Excludes spent acid. For detailed explanation see "Facts for Industry," Series 6-1-1.
* Revised.

PLASTICS AND SYNTHETIC RESINS: SHIPMENTS AND CONSUMPTION IN THE UNITED STATES, SEPTEMBER AND AUGUST 1945

(In pounds)

Item	*Shipments and Consumption* September 1945	August 1945
Cellulose acetate and mixed ester plastics:[1]		
Sheets:		
Continuous (under .003 gauge)	617,451	660,802
Continuous (.003 gauge and upward)	377,785	393,272
All other sheets, rod and tubes	317,508	378,190
Molding and extrusion materials	5,344,463	5,464,666
Nitrocellulose plastics:		
Sheets	735,514	862,509
Rods and tubes	486,640	554,189
Phenolic and other tar acid resins:		
Laminating (dry basis)	1,717,022	3,043,059
Adhesives (dry basis)	511,071	819,508
Molding materials[1]	9,949,599	10,001,797
All other (dry basis)[2]	3,006,906	3,334,160
Urea and melamine resins:		
Adhesives (dry basis)	2,227,825	3,035,535
Textile and paper treating (dry basis)	719,302	551,550
All other (dry basis)[2]	153,828	163,796
Polystyrene	1,712,417	5,295,476
Coumarone-indene type resins	(3)	
Vinyl resins:		
Sheeting and film[1]	1,185,090	1,140,662
Textile and paper coating resins (resin content)	1,366,602	1,813,385
Molding and extrusion materials[1]	2,216,090	3,956,140
Adhesives (resin content)	224,513	1,334,129
All other (resin content)[2]	665,568	
Miscellaneous plastics and resins:		
Molding and extrusion materials[1 4]	3,067,259	*3,731,259
All other (dry basis)[2 5]	2,614,375	2,599,459

* Revised to exclude vinyl materials.
[1] Includes filler, plasticizers and extenders.
[2] excludes data for protective coating resins.
[3] Cannot be shown separately without disclosing the operations of individual companies.
[4] Includes data for ethyl cellulose, urea and melamine, acrylic acid and miscellaneous molding and extrusion materials.
[5] Includes petroleum resins, acrylic acid ester resins, mixtures and miscellaneous synthetic resin materials.

from receiving lead- or tin-base scrap unless they had disposed of an amount at least equal to their current inventory during the preceding sixty days.

Zinc Output Rises Moderately

Except for a continued decline in inventories of slab zinc at consumers' plants, the zinc industry in October showed a general over-all gain in stocks, production, shipments, consumption and receipts, according to the Bureau of Mines, United States Department of the Interior.

Producers' stocks of zinc oxide and zinc dust reached the highest levels of any month during 1945. Stocks of zinc oxide recorded a 12-percent increase over the 26,478 tons on hand September 30; zinc dust showed a 37-percent gain over the 1,137-ton inventory at the end of September.

Potash Soap

The Potash Soap Division of the Association of American Soap and Glycerine Producers, Inc., reports that in 1944, seventy-six soap manufacturers, representing 69% of the total number in this country who make potash soaps, manufactured 126,481,523 pounds of potash soaps of all kinds. This total consisted of 72,618,687 pounds of liquid soap (8,543,375 gallons); 43,571,894 pounds of paste, soft, jelly, base, or hard potash soaps; 7,337,022 pounds of dry cleaning soaps; and 2,953,920 pounds of soaps not classified.

Ferrous Scrap Use Hits Record Low

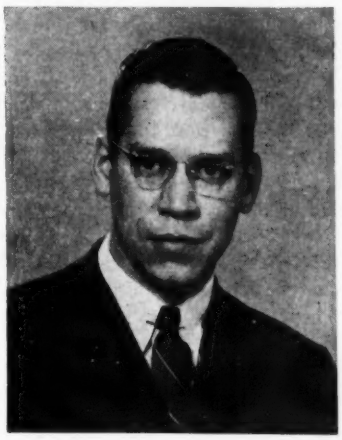
The sudden and unexpected cessation of hostilities following the dramatic use of the atomic bomb is reflected in an abrupt change in the scrap iron and steel position according to a statement released by the Bureau of Mines, United States Department of the Interior, in that consumption of home and purchased scrap and pig iron has reached a new low.

The total consumption of ferrous materials (scrap and pig iron) amounted to 7,106,000 gross tons, a 14 percent loss from the 8,286,000 tons reported used in July; the average daily melt of scrap and pig iron was 14 percent less in August than in July. The average daily use of purchased scrap, home scrap and pig iron decreased 12, 17, and 14 percent.

Stocks of iron and steel scrap at plants of consumers, suppliers and producers at the end of August 1945 approximated 4,848,000 gross tons, a 2 percent increase over the 4,762,000 tons reported on July 31, 1945. Consumers' stocks on August 31 amounted to 3,772,000 tons, compared with 3,611,000 tons on July 31, while combined stocks of suppliers and producers were 1,076,000 tons and 1,151,000 tons on the same dates.

powder form, soluble in hot water, which it is claimed will clean silver, by chemical action, in ten seconds.

Perlich Named Chief Analyst of 3-M Co.



R. W. Perlich has been appointed chief chemist of the analytical branch of Minnesota Mining & Manufacturing Co.'s Central Research Laboratory. The functions of Mr. Perlich's division will be the development of special analytical methods.

Stearns Develops Hayfever Remedy

A recently developed combination of neosynephrine, aminophylline, and phenobarbital, tradenamed Adnephrine, has been placed on the market by Frederick Stearns & Co., Detroit, as a hayfever remedy.

The compound has been under clinical study for several months, and allergists state that it is primarily indicated for asthmatic complications of hayfever.

It is anticipated that the product will be available, for prescription dispensation, this fall.

Diamond Alkali Acquires Sunshine Soda

Diamond Alkali Sales Corporation has announced that it has taken over the operation of the Baltimore and Boston branches of Sunshine Soda Company.

The Baltimore branch will be merged with Diamond's Philadelphia district office located at 12 South 12th Street, of which C. F. Wolters, Jr., is manager. H. A. Kurtz and A. DePhillips, former Sunshine Soda representatives in the Baltimore area, will continue to supply local service from Baltimore and Washington warehouses.

In Boston a new Diamond Alkali Sales office has been established at 80 Federal St. to take over the operation of the former Sunshine Soda branch in that city. H. B. Clark, formerly associated with Diamond's New York sales organization, will serve as Boston branch sales manager.

CANADIAN NEWS

by W. A. JORDAN

Investigate Thorium as Atomic Energy Source

Scientists at Canada's huge atomic energy project at Chalk River, Ont., are exploring the use of thorium as a source of atomic energy, according to a report tabled in the House of Commons by Prime Minister Mackenzie King, which provided the first public hint of the initiation of large scale atomic experiments with elements other than uranium. Actually, of the three standard radioactive progressions—uranium-radium, actinium and thorium—those of uranium and thorium are the most alike, and as noted by the Smyth report, thorium was considered as a source of atomic power, although uranium was finally chosen instead.

The Government-owned Chalk River plant, located 125 miles northwest of Ottawa, was nearing completion at the end of the war, and has hitherto been engaged basically in investigating the heavy water-uranium process. Some three hundred National Research Council scitists have been assigned to Chalk River coincident with the Government statement that the project has been created as "a permanent institution which in peacetime is expected to be the source of new radioactive material which will be valuable for the study of chemical and biological processes and for application in medicine."

Although Canada is a major producer of uranium, no commercial production of thorium has been reported in the Dominion, and India has long supplied three-quarters of the world's ordinary needs. Therefore the Chalk River raw material will have to be imported, unless an exploitable deposit has been discovered in Canada's north during the wartime security blackout.

Shawinigan Chemicals Buys Government Plants

Shawinigan Chemicals, Ltd., major Canadian producer of acetylene-based chemicals, has purchased all the Crown-financed, Shawinigan-operated facilities built during the war on its Shawinigan Falls property, and the additions made to the company's Bedford limestone quarries.

Listed as costing $4.1 million at the time of construction, the facilities were sold by the government to Shawinigan for $1¼ million. Terms of the sale are noted as $100,000 cash, and $100,000 annually, or the amount of the EPT refund during the previous twelve months, if the latter is in excess of $100,000. Interest on the unpaid balance is set at 3½ percent.

The facilities include additions to the acetylene black plant, and the entire synthetic butanol unit and monoethylaniline project, as well as the huge No. 7 carbide furnace division.

Merck Builds Streptomycin Plant

Merck & Co., Ltd., Montreal, has begun construction of Canada's first commercial plant for the manufacture of the new antibiotic drug, streptomycin, on its recently acquired 210-acre property at Valleyfield, Que. The construction schedule calls for the completion of a production unit, consisting of two buildings, by the latter part of this month, one of which, a boiler plant, will supply power for the streptomycin project, and also for other manufacturing operations which will be transferred from the Montreal plant of the company to the Valleyfield site over the next few years.

Merck, which installed the first deep-fermentation penicillin equipment in Canada, thereby becomes the Dominion's pioneer producer of streptomycin. However it is probable that another U. S.-controlled Montreal pharmaceutical concern will also advance from laboratory- to plant-scale streptomycin production in the near future.

Synthetic Resins Ltd. Plans Expansion

Synthetic Resins, Ltd., of Galt, Ont., is in the midst of an expansion program whereby it expects to double its capacity for making thermoplastics. It is also in the process of setting up equipment for the production of thermosetting materials.

The company is now in a position to manufacture liquid resins, cast resins, varnishes and lacquers, in addition to cellulose acetate and ethyl cellulose molding powders which it has been making for the past two years.

Create Technical Personnel Employment Bureau

For the first time in almost five years the available supply of technical personnel in Canada approaches demand, and in some areas actually exceeds the current needs of employers, even though the number of companies employing technologists is substantially greater than was the case in the prewar period.

Therefore, the permit system established by the Wartime Bureau of Technical Personnel, employed to channel personnel into the most essential occupations, has been revoked, and a simple reporting system has been substituted.

The sole requirements of the new regulations are that employers notify the Bureau of all vacancies existing in their establishments for technical personnel, and of the employment of any such individual. Likewise both employer and employee are required to notify the Bureau of cessation of employment.

Thereby, the Bureau, with offices located in major cities, is becoming essentially the Dominion's first national employment office, devoted to the placement of technical personnel, and to the needs of employers of such technologists.

Heads Shawinigan Research

R. S. Jane who has been named vice-president in charge of research of Shawinigan Chemicals Ltd. Dr. Jane studied at the Universities of British Columbia, London, and McGill.

Unshrinkable Woolens Unit Nears Completion

The first Canadian plant to be devoted entirely to the production of unshrinkable woolens, created as a subsidiary of York Knitting Mills, Ltd., Toronto, is scheduled to commence operations late this spring. The new concern, York Unshrinkable Wools, Ltd., will process both the products of its parent company, and those of other manufacturers either in the "tops" or "piece goods" stage.

The company owns the sole world rights —exclusive of England—of the new process, and claims absolute unshrinkability and at the same time retention of all the original desirable wool qualities such as elasticity, softness, etc.

In addition to Canadian activities, an Australian factory for the exploitation of the process is under construction, and company officials state that a U. S. A. unit is to be built soon. Other factories are also planned for South Africa and New Zealand.

Census Bureau

(*Continued from page 317*)

Treasurer of the United States is required before work is initiated in the Bureau. Such special tabulations, of course, can be made only as the facilities of the Bureau permit:

Reports on imports and exports no longer show detail figures on Customs Districts. This information will be supplied on request to the Census Bureau, ordinarily free of charge but on a cost basis if special compilations are required. Special annual tabulations for 1943 and 1944, with detail by Customs Districts, have been supplied to Department of Commerce Field Offices and to the U. S. Collectors of Customs. (These officials are located at important inland cities as well as at seaports. For a complete list, see "Foreign Commerce & Navigation of the United States.")

In addition to manufacturing and foreign trade, the Census Bureau welcomes correspondence on all types of statistics and is in position to supply a great variety of special compilations.

SELECTED CHECK-LIST OF PUBLICATIONS

A—Annual, Q—Quarterly, M—Monthly. Free of charge, unless price is shown.

Catalogs and Indexes

Catalog "Census Bureau Publications," January 1943
Census Publications, 1. Program for the Year (A)
Census Publications, 2. List of Publications Issued (M)
Census Publications, 3. Subject Guide (Q)
"Facts for Industry" Index of Publications (October 1945)
U. S. Foreign Trade Statistical Publications:
(a) Reports covering calendar years 1941-1944
(b) Monthly reports starting with statistics for January 1945
Census Publications, Price List 70-24th ed., May 1945 (Lists stocks of the Superintendent of Documents)

Aids to Use of Census Publications

How to Use Current Business Statistics (1928) Out of Print
List of Schedules Used by the Bureau of the Census for Collecting Data, 1945. (Sample schedules are obtainable on request)
The Work of the Census Bureau and How It Will Help Marketers (1944)
Schedule A Statistical Classification of Imports Into the United States—1943 Edition. Supplement, Jan. 1946 (P. B. 69-A) $0.50
Schedule B Statistical Classification of Domestic and Foreign Commodities Exported from the United States—1945 Edition
Part I Alphabetic Index. Supplement, Jan. 1946 (P. B. 73B-I) $1.00
Part II Numbered Classifications and Articles Included $0.65
Agriculture, handbook, descriptions and uses of census statistics in business, research, etc. 45c
Census Statistical Program for Business (press release) October 1945

Trade Journal Articles

Conklin, M. R., *Industrial Marketing 30*, No. 10, 98 (October 1945) "Census of Manufacturers to be Restored in 1946"
Gretton, O. C., *Plumbing & Heating Business* December 1945 "What the Census Bureau Tells You about Your Industry"
Reed, Vergil D., Industrial Marketing, April, 1942, "Research Today for Tomorrow's Markets"
Thomas, A. S., *Paper Mill News* December 8, 1945 "Why Pulp and Paper Statistics"
Van Swearingen, J. A., *Chem. & Met. Eng.*, January 1946 "Chemical Marketing Statistics Program of the Bureau of the Census"

Census of Manufacturers (Biennial, latest issue 1939)

Vol. I General Report, statistics by subjects $1.75
Vol. II Reports by Industries. Part 1. Industry Groups 1 to 10. ..... Out of print
"Separates" (reprints of sections on each of about 250 sub-industries) available as follows:
Group 1. Food and Kindred Products
Group 2. Tobacco Manufacturers
Group 3. Textile-Mill Products
Group 4. Apparel
Group 5. Lumber and Timber Products
Group 6. Furniture, etc.
Group 7. Paper
Group 8. Printing and Publishing
Group 9. Chemicals and Allied Products
Group 10. Products of Petroleum and Coal (Prices vary; see Census catalogs)
Part 2. Industry Groups 11 to 20 ..... $2.25
Group 11. Rubber Products
Group 12. Leather and Leather Products
Group 13. Stone, Clay, and Glass Products
Group 14. Iron and Steel and Their Products
Group 15. Nonferrous Metals and Their Products
Group 16. Electrical Machinery
Group 17. Machinery (except Electrical)
Group 18. Automobiles and Automobile Equipment
Group 19. Transportation Equipment Except Automobiles
Group 20. Miscellaneous Industries
Vol. III Reports by States and Cities .. $3.00

Census of Mineral Industries (Decennial, latest issue, 1939)

Vol. I General Summary and Industry Statistics $2.75
Vol. II State and County Statistics... $1.75

Census of Agriculture (Quinquennial, latest issue, 1940)

Vol. I Parts 1 to 5. Reports, by regions $1.50 to $2.75 each
Vol. II Parts 1 to 3. Three regions; statistics by counties, etc. $1.50 to $2.75 each
Vol. III Statistics by subjects $3.00

Census of Business (1939)

Vol. I Retail Trade
Part 1. U. S. Summary tables, etc. $2.50
Part 2. Commodity sales, analyzed by kinds of business, etc. $2.75
Part 3. Stores, sales, personnel, payrolls and stocks, analyzed by kinds of business, etc. $2.00
Vol. II Wholesale Trade $2.75
Vol. III Service Establishments $2.00
Vol. IV Construction $1.50
Vol. V Distribution of Manufacturers' Sales $1.25

(*Turn to page 347*)

MARKET OUTLOOK

●

Industry Anticipates High Sales Volume

The chemical industry which almost doubled its sales volume during five years of war, is still running at a high level of activity, although below the peak established in the early part of 1945. Business took a slight dip when war contracts were cancelled, but recovered later in the year.

At present, the industry is looking forward to a peacetime volume of sales as large, or even larger, than in wartime. This objective, however, will be delayed by reconversion difficulties in consuming industries.

Most major chemical manufacturers regard their industry as underbuilt, and have expansion plans blueprinted accordingly, for five years of research has developed many new products for civilian use which could not be produced in view of the restrictions on plant construction. Among the new products which it is felt hold much potential promise are organic insecticides, drugs, synthetic perfumes, and numerous new raw materials for paints. Likewise large markets are predicted for synthetic detergents, chemicals for treating paper to increase its toughness and wet-strength, and products for treating textiles to render them proof against shrinking, stains, and moths.

Papermakers Face Serious Chemical Shortage

Tight supply prospects over the coming months, and in most cases extending into 1947, in rosin, caustic soda, soda ash, chlorine, titanium dioxide, and starch, may result in serious chemical shortages for the pulp and paper industry, which has increased production with the anticipated improvement in pulpwood availability. Nearly all pulp and paper chemicals are only slightly eased from the stringent position existing during the war, with demand at such high levels that no surplus exists.

Many mills are increasing paper brightness from reduced war standards, which has upped requirements for chlorine, caustic soda, and ash. Although there is some indication that chlorine may ease slightly, one major producer reports output booked for the entire year.

A substantial increase in the use of soda ash and sodium bicarbonate in the production of detergents has reduced the quantity of ash which might have gone into the manufacture of caustic, and further cut the papermakers' supply. The entire position is not expected to improve materially in 1946.

Paper clay producers are sold to the limit of production, with labor shortages proving the main bottleneck. The corn shortage is being reflected in the availability of starch, and the situation in this respect is far from encouraging. Adequate supplies of rosin are not expected to materialize until well along in the gum producing season.

Titanium oxide is under producer allocation, and no real relief is in prospect until the end of the year, unless strikes in paint-consuming industries permit the channelling of additional quantities to the paper mills.

Sulphur inventories are ample for all needs, even though paper purchases in 1945 were up some 6 per cent over 1944.

Market Review

Heavy Chemicals—The heavy chemical market presented a highly sensitive tone as the result of spreading labor difficulties last month, and there is a tendency on the part of some users to defer orders, but this is more than offset by a willingness to double or triple commitments in other lines. In general prices have remained firm, although carbon tetrachloride and mercury have eased marketwise, and anhydrous ammonia for refrigeration purposes has been reduced $7.50 a ton to $61.50 by a leading producer.

Caustic soda, soda ash, borax, trisodium phosphate and potassium permanganate remain tight, and job lots of calcium chloride are selling above producers' prices. A year-long stringent market for the latter commodity appears in prospect.

The steel strike is being reflected in the availability of coal tar chemicals and stocks of benzol, benzidine base, orthocresol, and paradichlorobenzol are exceedingly low. The long term situation is aggravated by the fact that producers of coal tar intermediates have long been under pressure to meet the requirements of domestic dyestuff manufacturers, and now are faced with an additional heavy overseas demand for their products.

Actually, the entire chemical market has been strengthened by the fact that many foreign countries which have relied on Germany for chemicals are now looking to the U. S. A. as a source of supply.

Fine Chemicals—In order to meet competitive conditions, principal manufacturers of tartaric acid have reduced prices on tartaric acid, cream tartar, rochelle salt, and seidlitz mixture. The lower landed cost of Spanish tartarates has necessitated this price change, the first in these commodities since Sept. 4, 1941.

Substantial stocks of menthol are reported in Brazil, and with most U. S. consumers well supplied, prices may ease in the near future. Sulfa drugs, salicylates, and theobromine are commanding their usual seasonal attention, and moving in fair volume.

Glycerin and propylene glycol are active, although imports of glycerin from England may alleviate the supply stringency somewhat. Deliveries of strychnine salts are running behind schedule, but the DDT supply position is improving considerably.

Indications are that streptomycin may become a more important antibiotic than penicillin. Prices on penicillin, at present, are largely nominal with demand running ahead of supply.

Agricultural Chemicals—Although production of superphosphate has been bolstered in recent months by the release of sulfuric acid from munitions production, heavy shipments and the large quantities used in mixed fertilizers, have resulted in a decline in stocks on hand. Even though inventories are some 5 per cent above those of a year ago they are low in relation to current rate of consumption.

Likewise deliveries of ammonium sulfate are running behind schedule and are expected to continue thus for some time. A tightening in the supply position of major potash salts has also become evident in some areas.

Chemical lime remains as one item in an easy position, as a result of bolstered output by major producers.

Bureau of Commerce Chemical Forecast

Improvement in the supply of plastics materials is predicted by the chemical unit of the Bureau of Foreign and Domestic Commerce.

For the time being, however, continued shortages in the supply of alkalies, nicotine and plastics materials still are dominating the chemical picture, the report stated.

The situation on arsenical insecticides remains easy. October imports of arsenic included 2,044,000 pounds from Peru. Output of copper sulfate in October was 13 per cent above that of a year ago, while exports (8,550,000 pounds) were high for 1945, with 3,200,000 pounds destined for France.

Imports of rotenone for the first ten months of 1945 were 900,000 pounds above the corresponding 1944 figure. Pyrethrum imports for the first ten months of 1945 were almost double.

Discussing general production trends, the chemical unit report pointed out that one factor in the picture is the possible effect of the housing program for veterans upon industrial expansion program. These programs react on the chemical industry because they are competing for materials and labor which is still scarce.

Coal Tar Production of Anthracene Revived

Interest in the production of anthracene from coal tar for vat dyes may be revived in the U. S. A. as a result of the German development of a new plant insecticide, according to Miles A. Dahlen, assistant director of the du Pont technical laboratory. Dr. Dahlen spent several weeks in German recently on a U. S. government mission studying the wartime development of dyestuffs.

Hitherto, most of the anthaquinone used for vat colors in America has been made synthetically, rather than from coal tar anthracene, but the general use of tetra-nitro-carbazol as a substitute for arsenical insecticides in Germany was so great that anthracene and not carbazol has been in excess supply in recent years. In the distillation of coal tar, as practiced in the U. S. A., anthracene and carbazol are produced in the same fraction, and must be separated. The anthracene can be converted to anthraquinone but carbazol output would be far in excess of consuming requirements.

However, if the tetra-nitro-carbazol development should prove attractive to U. S. insecticide markets a substantial production of anthracene from coal tar might again be feasible.

Shellac Future Complicated by Ceilings

Unless shellac stocks held back in India are offered to American traders within the next month consumers in the U. S. A. will be faced with shortages, according to reports from suppliers. Present shipments being received from India are on contracts placed four to five months ago, but dealers have been hesitant to contract for the past six weeks in anticipation that price ceilings set by the Indian government in 1944, in agreement with England and the U. S. A., will be removed.

It is not anticipated by most dealers that domestic ceiling prices on shellac will be removed in the near future, and any removal of Indian ceilings would render importation for resale impossible under existing OPA regulations.

Carnauba Wax Outlook Beclouded

The outlook in carnauba wax is highly clouded by reason of the mixed reports in the trade regarding conditions in Brazil. Spot prices on No. 3 north country and chalky remain firm, and No. 1 yellow has increased slightly.

Some dealers continue to point to the small percentage of carnauba normally consumed in Europe, but others note the fact that Europe has been without supplies for several years and that a heavy demand is therefore in the offing.

CURRENT PRICES

Chemical prices quoted are of American manufacturers for spot New York, immediate shipment, unless otherwise specified. Products sold f.o.b. works are specified as such. Import chemicals are so designated.

Oils are quoted spot New York, ex-dock. Quotations f.o.b. mills, or for spot goods at the Pacific Coast are so designated.

Raw materials are quoted New York, f.o.b., or ex-dock. Materials sold f.o.b. works or delivered are so designated.

The current range is not "bid and asked," but are prices from different sellers, based on varying grades or quantities or both.

Purchasing Power of the Dollar: 1926 Average—$1.00
January, 1944, $0.890 *January, 1945, $0.890*
January, 1946, $0.857

	Current Low	Current High	1946 Low	1946 High	1945 Low	1945 High
Acetaldehyde,99%,drs.wks. lb.	.11	.14	.11	.14	.11	.14
Acetic Anhydride, drs, ...lb.	.11½	.13	.11½	.13	.11½	.13
Acetone, tks, delv. .....lb.	.06	.07	.06	.07	.06	.07
ACIDS						
Acetic, 28%, bbls ....100 lbs.	3.38	3.63	3.38	3.63	3.38	3.63
glacial, bbls. .....100 lbs.	9.15	9.40	9.15	9.40	9.15	9.40
tks, wks. .....100 lbs.	6.93	7.25	6.93	7.25	6.93	7.25
Acetylsalicylic, Standard USP .....lb.	.40	.54	.40	.54	.40	.54
Benzoic, tech. bbls. .....lb.	.43	.47	.43	.47	.43	.47
USP, bbls, 4,000 lbs. up lb.	...	.54	...	.54	...	.54
Boric tech, bbls. c-l. ...tons *a*	...	109.00	...	109.00	...	109.00
Chlorosulfonic, drs, wks. ..lb.	.03	.04½	.03	.04½	.03	.04½
Citric, USP, crys, gran, bbls. .....lb. *b*	.20	.21	.20	.21	.20	.21
Cresylic 50%, 210-215° HB, drs. wks. frt. equal gal.	.81	.83	.81	.83	.81	.83
Formic, 85%-90% cbys. lb.	.10	.11½	.10	.11½	.10	.11½
Hydrofluoric, 30% rubber, dms. .....lbs.	.08	.09	.08	.09	.08	.09
Lactic, 22%, lgt, bbls wks lb.	.039	.0415	.039	.0415	.039	.0415
44%, light, bbls wks ...lb.	.073	.0755	.073	.0755	.073	.0755
Maleic, Anhydride, drs ...lb.	.25	.26	.25	.26	.25	.26
Muriatic 18° cbys ....100 lb.	1.50	2.45	1.50	2.45	1.50	2.45
20° cbys, c-l, wks. ...100 lb.	...	1.75	...	1.75	...	1.75
22° cbys, c-l, wks. ...100 lb.	...	2.25	...	2.25	...	2.25
Nitric,36°,cbys, wks 100 lbs. *c*	5.00	5.25	5.00	5.25	5.00	5.25
38°, c-l, cbys, wks 100 lbs. *c*	...	5.50	...	5.50	...	5.50
40°, c-l, cbys, wks 100 lbs. *c*	...	6.00	...	6.00	...	6.00
42°, c-l, cbys, wks 100 lbs. *c*	...	6.50	...	6.50	...	6.50
Oxalic, bbls, wks .....lb.	.11¼	.12½	.11¼	.12½	.11¼	.12½
Phosphoric, 100 lb. cbys, USP .....lb.	.10½	.13	.10½	.13	.10½	.13
Salicylic tech, bbls .....lb.	.26	.42	.26	.42	.26	.42
Sulfuric, 60°, tks, wks ..ton	...	13.00	...	13.00	...	13.00
66°, tks, wks .....ton	...	16.50	...	16.50	...	16.50
Fuming 20% tks, wks. .ton	...	19.50	...	19.50	...	19.50
Tartaric, USP, bbls .....lb.	.70½	.71	.70½	.71	.70½	.71
Alcohol, Amyl (from Pentane) tks, delv .....lb.	...	.131	...	.131	...	.131
Butyl, normal, syn, tks lb.	...	.10¾	...	.10¾	...	.10¾
Denatured, CD 14, c-l drs .....gal. *d*	...	.613	...	.613	...	.59
Denatured, SD, No. 1, tks.*d*	...	.542	...	.542	...	.52
Ethyl, 190 proof tks...gal.	...	17.65½	...	17.65½	...	17.60
Isobutyl, ref'd, drs ....lb.	...	.0660	...	.0660	...	.086
Isopropyl ref'd, 91%, dms .....gal.	.38	.41	.38	.41	.37½	.66½
Alum, ammonia, lump, bbls, wks .....100 lb.	...	4.25	...	4.25	...	4.25
Aluminum, 98-99% ...100 lb.	15.00	16.00	15.00	16.00	15.00	16.00
Chloride anhyd l.c.l. wks lb.	.09	.12	.09	.12	.08	.12
Hydrate, light, bgs. ....lb.	...	.14½	...	.14½	.14½	.15
Sulfate, com'l. bgs, wks, c-l .....100 lb.	1.15	1.25	1.15	1.25	1.15	1.25
Sulfate, iron-free, bgs, wks .....100 lb.	1.75	2.00	1.75	2.00	1.75	2.10
Ammonia anhyd, cyl .....lb.						
Ammonia, anhyd. fert. tank cars, wks. frt. equalized ton	...	59.00	...	59.00	...	59.00
Ammonium Carbonate, USP, lumps, dms ....lb.	.08¼	.09¼	.08½	.09¼	.08¼	.09¼
Chloride,whi,bbls,wks,100 lb.	4.45	5.15	4.45	5.15	4.45	5.15
Nitrate, tech. bags, wks. lb.	.0435	.0450	.0435	.0850	.0435	.0850
Oxalate pure, grn. bbls. lb.	...	.23	...	.23	.27	.33
Perchlorate, kgs .....lb.	no stocks		no stocks		no stocks	
Phosphate, dibasic tech. bgs .....lb.	.07	.07¾	.07	.07¾	.07	.08½
Stearate, anhyd. dms....lb.	...	.34	...	.34	...	.34
Sulfate, dms, bulk ....ton	28.20	29.20	28.20	29.20	28.20	29.20
Amyl Acetate (from pentane) tks., delv. .....lb.	...	.14½	...	.14½	...	.15½
Aniline, Oil, drs .....lb.	.11½	.12½	.11½	.12½	.11½	.12½
Anthraquinone, sub, bbls...lb.	...	.70	...	.70	...	.70
Antimony Oxide, bgs ....lb.	.15	.16	.15	.16	.15	.16
Arsenic, whi, kgs—powd. lb.	.04	.04¾	.04	.04¾	.04	.04¾

USP $25 higher; Prices are f.o.b. N. Y., Chicago, St. Louis, deliveries ½c higher than NYC prices; *y* Price given is per gal; *c* Yellow grades 25c per 100 lbs less in each case; *d* Prices given are Eastern schedule. *a* Powdered boric acid $5 a ton higher; *b* Powdered citric acid is ½c higher.

	Current Low	Current High	1946 Low	1946 High	1945 Low	1945 High
Barium Carbonate precip, wks, bgs. ton	60.00	75.00	60.00	75.00	60.00	75.00
Chloride, tech, cyst, bgs, zone 1 ton	73.00	78.00	73.00	78.00	73.00	78.00
Barytes, floated, bbls. ton	...	36.00	...	36.00	...	36.00
Bauxite, bulk mines ton	7.00	10.00	7.00	10.00	7.00	10.00
Benzaldehyde,tech,cbys,dms lb.	.45	.55	.45	.55	.45	.55
Benzene (Benzol), 90%, tks, ft all'd gal.	...	.15	...	.15	...	.15
Benzyl Chloride, cbys lb.	.22	.24	.22	.24	.22	.24
Beta-Naphthol, tech, bbls, wks ton	.23	.24	.23	.24	.23	.24
Bismuth metal, ton lots lb.	...	1.25	...	1.25	...	1.25
Blanc Fixe, 66⅔% Pulp, bbls, wks ton *h*	40.00	46.50	40.00	46.50	40.00	46.50
Bleaching Powder, wks,100 lb.	2.50	3.60	2.50	3.60	2.50	3.60
Borax, tech, c-l, bgs ton *i*	...	45.00	...	45.00	...	45.00
Bordeaux Mixture, drs lb.	.11	.11½	.11	.11½	.11	.11½
Bromine, cases lb.	.21	.23	.21	.23	.21	.30
Butyl, acetate, norm. drs lb.	18.60	19.10	18.60	19.10	17.90	19.45
Cadmium Metal lb.	.90	.95	.90	.95	.90	.95
Calcium, Acetate, bgs, 100 lb.	3.00	4.00	3.00	4.00	3.00	4.00
Carbide, drs ton	50.00	90.00	50.00	90.00	50.00	95.00
Carbonate, c-l bgs ton	18.00	22.00	18.00	22.00	18.00	22.00
Chloride, flake, bgs c-l ton	18.50	35.00	18.50	35.00	18.50	35.00
Solid, 73-75⅔ drs, c-l, ton	18.00	34.50	18.00	34.50	18.00	34.00
Gluconate, U.S.P., drs. lb.	.57	.59	.57	.59	.57	.59
Phosphate, tri, bbls, cl lb.	...	.0635	...	.0635	...	.0635
Camphor, U.S.P., gran, powd, bbls lb.	.69	.71	.69	.71	.69	.71
Carbon Bisulfide, 55-gal drs lb.	.05	.05¾	.05	.05¾	.05	.05¾
Dioxide, cyl lb.	.06	.08	.06	.08	.06	.08
Tetrachloride, Zone 1, 52½ gal. drms lb.	.73	.80	.73	.80	.73	.80
Casein, Acid Precip, bgs, 100 or more lb.	...	.24	...	.24	...	.24
Chlorine, cyls, lcl, wks, contract lb.	...	.07¼	...	.07¼	...	.07¼
cyls, c-l, contract lb. *j*	...	.05¼	...	.05¼	...	.05¼
Liq. tk, wks, contract 100 lb.	...	1.75	...	1.75	...	1.75
Chloroform, tech, drs lb.	.20	.23	.20	.23	.20	.23
Coal tar, bbls, crude bbl.	8.25	8.75	8.25	8.75	8.25	8.75
Cobalt, Acetate, bbl lb.	...	.83¾	...	.83¾	...	.83¾
Oxide, black kgs lb.	...	1.84	...	1.84	...	1.84
Copper, metal 100 lb.	12.00	12.50	12.00	12.50	12.00	12.50
Carbonate, 52-54%, bbls. lb.	.19½	.20½	.19½	.20½	.19½	.20½
Sulfate, bgs, wks cryst. 100 lb.	5.00	5.50	5.00	5.50	5.00	5.50
Copperas, bulk, c-l, wks ton	...	14.00	...	14.00	...	14.00
Cresol, USP, drs lb.	.10¾	.11¾	.10¾	.11¾	.10¾	.11¾
Cyanamid, bgs ton	1.52½	1.62½	1.52½	1.62½	1.52½	1.62½
Dibutylamine, c-l, drs, wks,	...	.66	...	.66	...	.66
Dibutylphthalate, drs lb.	17.20	23.59	17.20	23.59	17.70	23.59
Diethylaniline, lb drs lb.	...	.40	...	.40	...	.40
Diethyleneglycol, drs, wks lb.	.14	.15	.14	.15	.14	.15½
Dimethylaniline, dms,cl.,lcl lb.	.21	.22	.21	.22	.23	.24
Dimethyl phthalate, drs lb.	18.75	19.25	18.75	19.25	18.75	19.25
Dinitrobenzene, bbls lb.	...	.18	...	.18	...	.18
Dinitrochlorobenzene, dms lb.	...	.14	...	.14	...	.14
Dinitrophenol, bbls lb.	...	.22	...	.22	...	.22
Dinitrotoluene, dms lb.	...	.18	...	.18	...	.18
Diphenyl, bbls lcl. wks. lb.	.16	.20	.16	.20	.16	.20
Diphenylamine bbls lb.	...	.25	...	.25	...	.25
Diphenylguanidine, drs lb.	.35	.37	.35	.37	.35	.37
Ethyl Acetate, tks, frt all'd lb.	.0975	.1175	.0975	.1175	.0975	.1175
Chloride, drs lb.	.18	.20	.18	.20	.18	.20
Ethylene Dichloride, lcl. wks, E. Rockies, dms lb.	.0842	.0941	.0842	.0941	.0842	.0941
Glycol, dms, cl. lb.	...	.10	...	.10	...	.10
Fluorspar, No. 1, grd.95-98% bulk, cl-mines ton	...	37.00	...	37.00	...	37.00
Formaldehyde, bbls, cl & lcl lb.	.0520	.0570	.0520	.0570	.0520	.0570
Furfural tech, dms, c-l,wks lb.	...	.13	...	.13	...	.13
Fusel Oil, ref'd, dms, dlvd lb.	.18½	.19½	.18½	.19½	.18½	.19½
Glauber's Salt, Cryst, c-l, bgs, bbls, wks 100 lb.	1.05	1.45	1.05	1.45	1.05	1.45
Glycerine dynamite, dms, c-l, lb.	.17½	.18¼	.17½	.18¼	...	.16½
Crude Saponification, 80% to refiners tks lbs.	...	.11½	...	.11	.09½	.11½

GUMS

Gum Arabic, amber sorts bgs lb.	.12½	.13	.11¾	.14	.11	.13
Benzoin Sumatra, CS lb.	.52	1.00	.52	1.00	.52	1.00
Copal, Congo lb.	...	.55¾	...	.55¾	...	.55¾
Copal, East India, chips lb.	...	.53¼	...	.53¼	...	.53¼
Macassar dust lb.	...	.07⅜	...	.07⅜	...	.07⅜
Copal Manila,	.13½	.15½	.13½	.15½	.13½	.15½
Copal Pontianak, bold c-l lb.	...	.17⅜	...	.17⅜	...	.23⅜
Karaya, bbls, bxs, dms. lb.	.18	.46	.18	.46	.15	.46

ABBREVIATIONS—Anhydrous, anhyd; bags, bgs; barrels, bbls; carboys, cbys; carlots, c-l; less-than-carlots, lcl; drums, drs; kegs, kgs; powdered, powd; refined, ref'd; tanks, tks; works, f.o.b., wks.

Current Prices

Gums
Salt Lake

		Current		1946		1945	
		Low	High	Low	High	Low	High
Kauri, N. Y.							
Superior Pale XXX	lb.		.65¾		.65¾		.65¾
No. 3	lb.		.22		.22		.22
Sandarac, cs	lb.	.97½	.99½	.97½	.99½		.99½
Tragacanth, No 1, cases	lb.	3.80	3.90	3.80	3.90	3.80	5.00
No. 3	lb.	2.15	2.60	2.15	2.60	2.15	3.00
Yacca, bgs	lb.	.06	.07¼	.06	.07¼	.06	.07¼
Hydrogen Peroxide, cbys	lb.	.15½	.18½	.15½	.18½	.15½	.18½
Iodine, Resublimed, jars	lb.	1.75	1.85	1.75	1.85	1.75	2.10
Lead Acetate, cryst, bbls.	lb.		.12½		.12½		.12½
Arsenate basic, bg, lcl	lb.	.12	.12½		.12	.11½	.12
Nitrate, bbls.	lb.		.12½		.12½		.12½
Red, dry, 95% Pb_3O_4 bbls.	lb.	.09	.10¾	.09	.10¾	.09	.10¾
97% Pb_3O_4, bbls delv.	lb.	.09½	.11	.09½	.11	.09¼	.11
98% Pb_3O_4, bbls delv.	lb.	.09½	.11¼	.09½	.11¼	.09½	.11¼
White, bbls	lb.	.08¼	.08¾	.08¼	.08¾	.08¼	.08¾
Basic sulfate, bbls, lcl	lb.	.07¼	.08	.07¼	.08	.07¼	.08
Lime, Chem., wks, bulk	ton	6.50	9.25	6.50	9.25	6.25	13.00
Hydrated, f.o.b. wks	ton	8.50	12.00	8.50	12.00	8.50	16.00
Litharge, coml, delv. bbls.	lb.	.08	.09¾	.08	.09¾	.08	.09¾
Lithopone, ordi., bgs	lb.	.04¼	.04½	.04¼	.04¾	.04¼	.04¾
Magnesium Carb, tech, wks	lb.	.07¼	.10¾	.07¼	.10¾	.06¼	.10¾
Chloride flake, bbls, wks c-l	ton		32.00		32.00		32.00
Manganese, Chloride, Anhyd. bbls	lb.	.15	.18	.15	.18	.15	.18
Dioxide, Caucasian bgs, lcl	ton	74.75	79.75	74.75	79.75	74.00	79.75
Methanol, pure, nat, drs gal *l*		.63	.73	.63	.73	.63	.76
Synth, drs cl gal. *m*		.31	.38	.31	.38	.31	.38
Methyl Acetate, tech tks	lb.	.06	.07	.06	.07	.06	.07
C.P. 97-99%, tks, delv	lb.	.09½	.10½	.09½	.10½	.09½	.10½
Chloride, cyl	lb.	.32	.40	.32	.40	.32	.40
Ethyl Ketone,tks,frt all'd	lb.		.08		.08		.08
Naphtha, Solvent, tks	gal.		.27		.27		.27
Naphthalene, crude, 74°, wks tks	lb.		.0275		.0275		.0275
Nickel Salt, bbls, NY	lb.	.13	.13½	.13	.13½	.13	.13½
Nitre Cake, blk	ton		16.00		16.00		16.00
Nitrobenzene, drs, wks	lb.	.08	.09	.08	.09	.08	.09
Orthoanisidine, bbls	lb.		.70		.70		.70
Orthochlorophenol, drs	lb.	.25	.27	.25	.27	.25	.27
Orthodichlorobenzene, drms	lb.	.07	.08	.07	.08	.07	.08
Orthonitrochlorobenzene, wks	lb.	.15	.18	.15	.18	.15	.18
Orthonitrotoluene, wks,dms	lb.		.09		.09		.09
Paraldehyde, 98%, wks lcl.	lb.		.12		.12		.12
Chlorophenol, drs	lb.	.24	.27	.24	.27	.25	.32
Dichlorobenzene, wks	lb.	.11	.15	.11	.15	.11	.15
Formaldehyde, drs, wks	lb.	.21	.22	.21	.22	.21	.22
Nitroaniline, wks, kgs	lb.	.43	.45	.43	.45	.43	.45
Nitrochlorobenzene, wks	lb.		.15		.15		.15
Toluenesulfonamide, bbls	lb.		.70		.70		.70
Toluidine, bls, wks	lb.		.48		.48		.48
Penicillin, ampules per 100,000 units		.55	.95	.55	.95	.59	2.40
Pentaerythritol, tech	lb.	.27	.31	.27	.31	.27	.33

PETROLEUM SOLVENTS AND DILUENTS

Lacquer diluents, tks, East Coast	gal.		.11½		.11½		.11
Naphtha, V.M.P., East tks, wks	gal.		.11		.11		.11
Rubber solvents, East, tks, wks	gal.		.11		.11		.11
Stoddard Solvents, East, tks, wks	gal.		.10		.10		.10

Phenol, U.S.P., drs	lb.	.10½	.11¼	.10½	.11¼	.10½	.11¼
Phthalic Anhydride, cl and lcl, wks	lb.	.13	.14	.13	.14	.13	.14
Potash, Caustics, 88-92%, wks, sol.	lb.	.06¼	.06¾	.06¼	.06¾	.06¼	.06¾
flake, 88-92%	lb.	.07	.07½	.07	.07½	.07	.07½
liquid, 45% basis, tks	lb.		.02⅞		.02⅞		.0275
dms, wks	lb.	.03¼	.03½	.03	.03½	.03	.03½
Carbonate, hydrated 83-85%	lb.		.05½		.05½	.05½	.05¾
Chlorate crys, bgs, wks	lb.	.11	.13	.11	.13	.11	.13
Chloride, crys, tech, bgs, kgs	lb.	.08	nom.	.08	nom.	.08	nom.
Cyanide, drs, wks	lb.		.55		.55		.55
Iodide, bots., or cans	lb.	1.44	1.48	1.44	1.48	1.44	1.48
Muriatic dom, 60-62-63% K_2O bulk unit-ton	ton		.53½		.53½	.53½	.56
Permanganate, USP, wks dms	lb.	.20½	.21	.20½	.21	.20½	.21
Sulfate, 90%, basis, bgs	ton		36.25		36.25		36.25
Propane, group 3, tks	gal.		.03¾		.03¾		.03¾
Pyridine, ref., drms	lb.	.45	.45½	.45	.45½	.45½	.46
R Salt, 250 lb bbls, wks	lb.		.65		.65		.65
Resorcinol, tech, drms, wks	lb.	.64	.74	.64	.74	.64	.75
Rochelle Salt, cryst	lb.	.43½	.47	.43½	.47	.43½	.47
Salt Cake, dom, blk wks	ton		15.00		15.00		15.00

l Producers of natural methanol divided into two groups and prices vary for these two divisions; *m* Country is divided in 4 zones, prices varying by zone.

* Spot price is ½c higher.

		Current		1946		1945	
		Low	High	Low	High	Low	High
Saltpetre, grn, bbls.	100 lb.	8.20	8.60	8.20	8.60	8.20	8.60
Shellac, Bone dry, bbls	lb. r	.42½	.46	.42½	.46	.42½	.46
Silver Nitrate, 100 oz, bots 2,500-oz. lots	oz.	.47	.47¾	.47	.47¾	.47	.47¾
Soda Ash, 58% dense, bgs, c-l, wks	100 lb.	...	1.15	...	1.15	...	1.15
58% light, bgs cl.	100 lb.	1.05	1.18	1.05	1.18	1.05	1.13
Caustic, 76% flake drms, cl	100 lb.	...	2.70	...	2.70	...	2.70
76% solid, drms,cl	100 lb.	...	2.30	...	2.30	...	2.30
Liquid, 47-49%, sellers, tks	100 lb.	...	1.95	...	1.95	...	1.95
Sodium Acetate, anhyd. dms	lb.	.08½	.10	.08½	.10	.08½	.10
Benzoate, USP dms	lb.	.46	.52	.46	.52	.46	.52
Bicarb, tech., bgs., cl., works	100 lb.	1.55	1.90	1.55	1.90	1.55	1.90
Bichromate, bgs,wks l.c.l.	lb.	.07⅞	.08⅛	.07⅞	.08⅛	.07½	.08⅛
Bisulfite powd, bbls, wks	100 lb.	3.00	3.60	3.00	3.60	3.00	3.60
35° bb's., wks	100 lb.	1.40	1.65	1.40	1.65	1.40	1.65
Chlorate, kgs, wks c.l.	lb.	...	.06¼	...	.06¼	...	.06¼
Cyanide, 96-98%, wks	lb.	.14½	.15	.14½	.15	.14½	.15
Fluoride, 95%, bbls, wks	lb.	.07¼	.08¼	.07¼	.08¼	.07¼	.08¼
Hyposulfite, cryst, bgs, cl, wks	100 lb.	...	2.25	...	2.25	...	2.25
Metasilicate, gran, bbl, wks c-l	lb.	...	2.50	...	2.50	...	2.50
Nitrate, imp, bgs	ton	...	33.00	...	33.00	...	33.00
Nitrite, 96-98% bbl. cl.	lb.	...	.06¾	...	.06¾	...	.06¾
Phosphate, di anhyd. bgs. wks.	100 lb.	6.00	6.75	6.00	6.75	6.00	7.25
Tri-bgs, cryst, wks	100 lb.	2.70	3.10	2.70	3.10	2.70	3.45
Prussiate, yel, bb's. wks	lb.	...	.11	...	.11	...	.11
Silicate, 52°,drs, wks	100 lb.	1.40	1.80	1.40	1.80	1.40	1.80
40°, drs, wks, c-l	100 lb.	...	.80	...	.80	...	.80
Silicofluoride, bbls NY	lb.	.06½	.10	.06½	.10	.06½	.10
Sulfate tech. Anhyd. bgs	100 lb.	1.70	2.20	1.70	2.20	1.70	2.20
Sulfide, cryst c-l, bbls, wks	100 lb.	...	2.40	...	2.40	...	2.40
Solid, bbls, wks	lb.	3.15	3.90	3.15	3.90	3.15	3.90
Starch, Corn, Pearl, bgs	100 lb.	...	4.08	...	4.08	...	4.08
Potato, bgs, cl	lb.	...	.0637	...	.0637	...	.0637
Rice, bgs	lb.	no stocks		no stocks		no stocks	
Sweet Potato, bgs	lb.	no stocks		no stocks		no stocks	
Sulfur, crude, mines	ton	...	16.00	...	16.00	...	16.00
Flour, USP, precp, bbls, kgs	lb.	.18	.30	.18	.30	.18	.30
Roll, bbls	100 lb.	2.40	2.90	2.40	2.90	2.40	2.90
Sulfur Dioxide, liquid, cyl	lb.	.07	.08	.07	.08	.07	.09
tks, wks	lb.	...	.04	...	.04	...	.04
Talc, crude, c-l, NY	ton	...	13.00	...	13.00	...	13.00
Ref'd, c-l, NY	ton	13.00	21.00	13.00	21.00	13.00	21.00
Tin, crystals, bbls, wks.	lb.	no stocks		no stocks		no stocks	
Metal	lb.	...	.52	...	.52	...	.52
Toluol, drs, wks	gal.	...	.32	...	.32	...	.33
tks, frt all'd	gal.	...	.27	...	.27	...	.28
Tributyl Phosphate, dms lcl, frt all'd	lb.	...	.49	...	.49	...	.47
Trichloroethylene,dms,wks	lb.	.08	.09	.08	.09	.08	.09
Tricresyl phosphate tks	lb.	...	.24	...	.24	...	.24
Triethylene glycol, dms.	lb.	.18½	.19½	.18½	.19½	.18½	.19½
Triphenyl Phos, bbls	lb.	.26	.27½	.26	.27½	.26	.31
Urea, pure, cases	lb.	...	.12	...	.12	...	.12
Wax, Bayberry, bgs	lb.	no stocks		no stocks		no stocks	
Bees, bleached, cakes	lb.	.60	.63	.60	.63	no stocks	
Candelilla, bgs crude	ton	.62	.65	.62	.65	.35	.36
Carnauba No. 1, yellow, bgs, ton	lb.	no stocks		no stocks		no stocks	
Xylol, Indus. frt all'd, tks, wks	gal.	...	.26	...	.26	...	.27
Zinc Chloride tech fused, wks	lb.	.05	.0535	.05	.0535	.05	.0535
Oxide, Amer, bgs, wks	lb.	.07¼	.07½	.07	.07½	.07	.07½
Sulfate, crys, bgs	100 lb.	3.40	4.15	3.40	4.15	3.40	4.15
OILS AND FATS							
Babassu, tks, futures	lb.	...	.111	...	.111	...	.111
Castor, No. 3, bbls	lb.	.13¾	.14¼	.13¾	.14¼	.13¾	.14¼
China Wood, drs, spot NY	lb.	.39	.41	.39	.41	.39	.41
Coconut, edible, drs NY	lb.	...	.0985	...	.0985	...	.0985
Cod Newfoundland, dms	gal.	.88	.90	.88	.90	.85	.90
Corn, crude, tks, wks	lb.	...	.12¾	...	.12¾	...	.12¾
Linseed, Raw, dms, c-l	lb.	...	.1550	...	.1550	...	.1550
Menhaden, tks		...	.1225	...	.1225	...	.1225
Light, pressed, drs l.c.l	lb.	...	.1300	...	.1300	...	.1300
Palm, Niger, dms	lb.	...	.0865	...	.0865	...	.0865
Peanut, crude, tks, f.o.b. wks	lb.	.12⅞	.13⅞	.12⅞	.13⅞	.12⅞	.13⅞
Perilla, crude dms, NY	lb.	no stocks		no stocks		no stocks	
Rapeseed, New Orleans, bulks	lb.	...	.1156½	...	.1156½	...	.1156½
Red, dms	lb.	.13¼	.14¼	.13¼	.14¼	.12¼	.14¼
Soy Bean, crude, tks, wks	lb.	...	.1175	...	.1175	...	.1175
Tallow, acidless, bbls	lb.	...	.14¼	...	.14¼	...	.14¼

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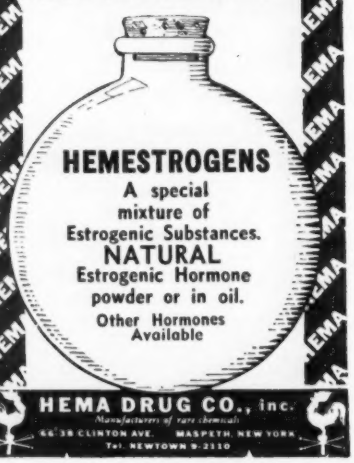

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Raymond No. 0 Automatic Pulverizer
5′ x 33′ Steam Jacketed Vacuum Dryer
8—3 x 4 and 4 x 7 Hummer Screens
3 x 30, 3½ x 24, 5½ x 60, 6 x 40 and 6 x 59 Direct Heat Dryers
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1—4′ x 6′ Vertical, Iron Body, Steel Jacketed, 200 lbs. Pressure—600 gals.
1—6′ x 15′ Vertical Steel, Jacketed, 125 lbs. Pressure—3400 gals.
1—10′ x 25′ Vertical or Horizontal, Forge Welded Steel, Jacketed, 100 lbs. Pressure.

AGITATOR DRIVES

1—D.O. James—Size 1300 Vertical Worm Gear, Ratio 82 to 1, with base plate for 5 H.P. motor drive.
1—General Electric Vertical Gear Reduction Output Speed 5 R.P.M.—7½ H.P. G.E. Motor—Totally Enclosed—220 volts—3 phase—60 cycle.

CONDENSERS

1—Goubert Iron Body Condenser, 1¼″ Brass Tubing, 330 sq. ft. Surface
1—Devine Unit Surface Condenser, ⅞″ Copper Tubing, 120 sq. ft. Surface.
1—All Copper Condenser, 1¼″ Tubing, 300 sq. ft. Surface.

CRYSTALLIZERS

4—4′ x 24′ x 2′6″ Deep Stainless Clad Steel, Jacketed—1800 gals.

DRYERS

1—4 ft. Dia. x 6 ft. long Steel Dryer, Inside lined with Sprayed Stainless Steel, Foote Bros. Reducer Drive.
3—Barlett & Snow Vertical Steel, Jacketed, 10′ dia. x 4′ high. Agitators, Reducers, 2 H.P. Motors.

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1—Burkhardt 40″ dia. with Rubber Covered Baskets.
1—King & Gerber, 38″ dia. with Bronze Basket.

FRACTIONATING COLUMNS

1—18′ dia. — Cast Iron — with Dephlegmator — 15 sections, each 6″ high — 2 top & bottom sections each 18½″ high.

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1—750 Gal., Glass Lined, Steel, with Cover. No Agitator or Drive.
1—4′ dia. x 7′ deep, open top, jacketed steel kettle, bottom outlet, no agitator or drive. 700 gals. capacity.
1—6′-9″ dia. x 9′-0′ deep, "Lehigh" Cast Iron Kettle with 2 Heating Coils, Agitator & Drive, 2500 gals. capacity.
1—6′ dia. x 8′ deep Steel Kettle with removable Head, 1600 gals. capacity.
1—6′ dia. x 4′ deep copper kettle with steel jacketed agitator or drive.

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1—16″ Style D Schutz O'Neill Pulverizing Mill.
1—20″ Style D Schutz O'Neill Pulverizing Mill.
1—Raymond Impact Mill, Direct Drive.
1—No. 21 Quaker City Hammer Mill.
1—15″ x 8″ Jeffrey Rigid Hammer Mill.
1—Stokes No. 43 Granulator.
1—Robinson Unique Jr. Grinder.

PUMPS

3—Devine Rotary Valve Vacuum Pumps. Size 8″ x 6¼″—52 cu. ft. Displacement.
2—Devine Rotary Valve Vacuum Pumps. Size 10″ x 10″—113 cu. ft. Displacement.
1—Beach Russ High Vacuum Pump—Series 100, Type R.P.—capacity 100 cu. ft. Min., complete with 5 H.P. Motor.
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1—Shriver Diaphragm 3A—Rubber lined, 90 gals., motor chain drive.
4—Vacuum single phase stokes—size 8″ x 6″, pulley drive.
1—Quimby 4 stage Centrifugal, 500 gals. — 75 H.P. G.E. motor.
1—American Well 2 Stage Centrifugal, 350 gal. 30 H.P. G.E. motor, Magnetic Starter.
1—Gould Triplex Plunger—size 3″ x 4″—25 gals.
2—Gould Triplex Plunger — size 8″ x 10″ — 400 V Belt Drive.
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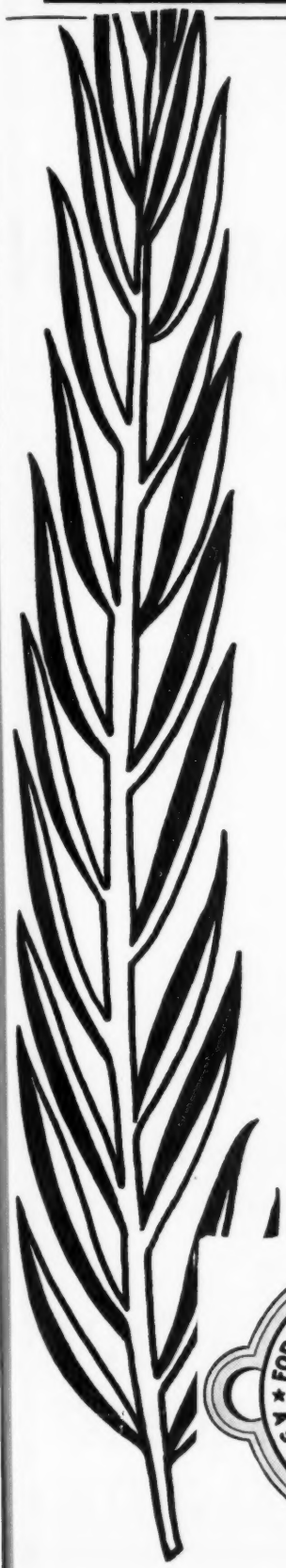

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1—No. 12, 20" x 37", Rotex.
1—Tyler Rotap Testing Sieve, with 24 screens.
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19—22" x 12' long, in 6' frame sections.

5—B. & C. 28" Dia. x 60" face Atmospheric Double DRUM DRYERS, complete.
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Pebble Mills
Percolators
Pulpers
Pulverizers
Pumps
Presses
Pressure Cookers
Pressure Vessels
Reaction Vessels
Retorts
Rinsers
Roll Mills
Roller Conveyor
Rotary Dryers
Screw Conveyor
Sealers
Sifters
Sifters & Mixers
Skids
Sterilizers
Stills
Tablet Machines
Towers
Tube Fillers, Closers and etc.
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Vacuum Dryers
Vacuum Fillers
Vacuum Pans
Vacuum Pumps
Visco Fillers
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4—84″ dia. RECTIFYING COLUMNS; 1—All copper, 15′ high, 15 plates. 2—All copper, 23′ 6″, 28 plates; 1—Steel 30′ 8″ high, 9 plates.

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2—48″ dia. copper RECTIFYING COLUMNS; 1—23′ high, 30 plates; 1—8′ 2″ high, 8 plates.

2—42″ dia. copper REFINING COLUMNS; 1—27′ high, 37 plates, with 12000 gallon steel still pot; 1—21′ 2″ high, 37 plates, with 12000 gallon steel still pot.

1—42″ dia. copper COLUMN, 18′ 6″ high, 9 plates.

2—24″ and 30″ dia. x 16′ high copper RECTIFYING COLUMNS, 19 plates.

With the above are the necessary interconnecting piping, condensers, preheaters, calandrias, separators, float controls, etc.

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2—ALUMINUM horizontal TANKS, 7′ 3″ dia. x 34′ L., 10,500 gal.

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2—STEEL TANKS, 1—20′ dia. x 25′ high, 58,000 gal.; 1—16′ dia. x 20′ high, 30,000 gal.

39—STEEL TANKS, horizontal and vertical, 22,500 gal. to 1200 gal. Ask for list.

18—Ceco motor driven BRONZE CENTRIFUGAL PUMPS, 2½ x 2; 6 1½ x 1.

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1—All Copper triple effect, Vertical tube EVAPORATOR, 2000 sq. ft. per effect complete.

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1—Baldwin 27 ton Saddle Tank LOCOMOTIVE, std. gauge, 6 wheel.

1—Baldwin 57 ton LOCOMOTIVE, std. gauge.

4—6000 gal. ARA steel TANK CARS.

1—Fairbanks TRACK SCALE, 42′ long, 200,000 lb. capacity.

1—O & S std. gauge, 8-wheel Steam LOCOMOTIVE CRANE, 36′ latticed boom, ¾ yd. clamshell bucket.

2—10 Ton and 1 6 Ton, hand BRIDGE CRANES, 45′, 38′, 21′ span.

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1—200 KW Allis Chalmers ENGINE GENERATOR SET, non-condensing, 3/60/480 volts.

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Established organic chemical company located in Philadelphia offers opportunity to capable engineer accustomed to using common sense and having ability to improvise when necessary. Ideal conditions, plenty of opportunity. Replies in confidence. State salary and past experience. Box No. 2083,

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522 Fifth Ave., New York 18, N. Y.

SALESMAN with technical training wanted by expanding chemical manufacturer for sales development and promotion in specialties field in New York area. Reply in detail, including salary expected. Box No. 2082.
Chemical Industries, 522 Fifth Ave.,
New York 18, N. Y.

WANTED—Salesman for Middle West territory to sell raw materials to paint and varnish, insecticide, chemical and allied industries. Chemical education and sales experience in the above lines preferred. Good future. Box 2087
Chemical Industries, 522 Fifth Ave.,
New York 18, N. Y.

SITUATIONS WANTED

Ex-Naval officer, 36, married, Protestant, 12 years' background Technical Sales executive, Eastern half U. S. for major oil company on petroleum byproducts and chemicals; member foremost technical societies; desires to hear from company interested in building up new sales division; available New York City for interview; salary requirements $10,000 minimum, salary or commission basis. Box 2089.
Chemical Industries, 522 Fifth Ave.,
New York 18, N. Y.

DEVELOPMENT-PRODUCTION CHEMIST: Do you need a man (Ph. D., 39, former officer) to develop and supervise production of new products? Wide and varied experience in detergents, petroleum, toxic materials. Midwest preferred. Box 2086.
Chemical Industries, 522 Fifth Ave.,
New York 18, N. Y.

PURCHASING AGENT—31, eight years experience in Chemical Industries capable of handling Production Planning, Expediting, Stock Control and Purchasing of Chemicals, Plastics, Varnishes, Resins, Waxes, General Supplies and Equipment. Location immaterial, excellent references. Available immediately. Box 2084.
Chemical Industries, 522 Fifth Ave.,
New York 18, N. Y.

MARKET RESEARCH CHEMIST: Eight years experience in economic and technical survey, research, process development and production. Have responsible supervisory position of large group of research chemists. Desires work involving the collection and presentation of economic and technical facts to aid management in planning expansion. Married. Age 30. Present salary $5500. Box 2085.
Chemical Industries, 522 Fifth Ave.,
New York 18, N. Y.

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GRADUATED CHEMICAL ENGINEER WITH LONG EXPERIENCE IN CHINA & JAPAN IN MANAGING POSITIONS WISHES TO COMMUNICATE WITH SUPPLIERS OF COMPLETE PLANT EQUIPMENT AND/OR—MACHINERIES CONCERNING REPRESENTATION OF SALES-INTERESTS. PLEASE REPLY ON AIRMAIL PAPER TO BOX 2081, CHEMICAL INDUSTRIES, 522 FIFTH AVENUE, NEW YORK 18, N. Y., FOR RE-DIRECTING OF MAIL TO SHANGHAI.

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Philadelphia 24, Pa.

RELIABLE MANILA FIRM DESIRES TO REPRESENT AMERICAN MANUFACTURERS OF DRUGS, CHEMICALS, PATENT MEDICINES, DYESTUFFS AND ALLIED PRODUCTS. WRITE AIRMAIL PHILIPPINE CHEMICAL LABORATORY, INC., 301 WILSON BUILDING, MANILA, P. I.

SALES REPRESENTATION—Chemical Engineer with 15 years plant production and 10 years selling experience as sales engineer and district manager will open resident selling office in CLEVELAND. Excellent coverage of OHIO is assured aggressive manufacturers desiring or requiring chemical knowledge to present, sell or service their products. Will accept non-conflicting lines only. All inquiries answered in confidence. **Box 2079**, Chemical Industries, 522 Fifth Ave., New York 18, N. Y.

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Census Bureau

(*Continued from page 331*)

Vol. IV Construction $1.50
Vol. V Distribution of Manufacturers' Sales $1.25

Statistical Abstract of the United States

(A) Latest issue, 1943 ..... $1.75

Census of Population (decennial; latest issue 1940)

Vol. I Number of Inhabitants $2.50
Vol. II Characteristics of the Population 7 parts, by regions ..... each $2.75
Vol. III The Labor Force (occupation, industry, employment, income)
Part 1 U. S. Summary $0.75
Parts 2-5, by regions ..... each $2.75
Vol. IV Characteristics by Age
Part 1 U. S. Summary $0.40
Parts 2-4, by regions ..... $3.00 to $3.25

Facts for Industry Report Series

Data on production, consumption, stocks, shipments, etc. Most series start with 1941 or 1942. All are free on request.

Chemicals and Allied Products

Series No.		
6-1	Chemicals (inorganic)	(M)
6-1-1	Supplement o. 1, Sulfuric Acid, 1943 and 1944	—
6-1-1	Supplement No. 2. Chemicals, 18 new items 1941-45	—
6-2	Chemicals—Synthetic Organic (Order from U. S. Tariff Commission)	(M)
6-3	Chemicals (selected products of mines, coke ovens and smelters)	(M)
6-4	Animal Glue and Gelatin	(Q)
5-5	Photographic Film	(Q)
M15F	Pyroxylin Coated Fabrics and Paper	(M)
M17A	Animal and Vegetable Fats and Oils	(M,Q,A)
M17-3	Cottonseed Products	(M)
M17-4	Cottonseed and Cottonseed Products	(M)
—	Cotton and Cottonseed Products	(A)
M19D	Superphosphate	(M)
M19H	Cellulose Plastic Products	(M)
M19J	Paint, Varnish, Lacquer and Fillers; Trade and Industrial Sales	(M)
M19K	Plastic Paints, Cold-Water Paints and Calcimines	(M)
M19L	Lacquer. Sales classified by type of lacquer	(Q)
—	Plastic Materials for Protective Coatings (in preparation)	(Q)

Paper and Allied Products

Series No.		
24-1	Census of Pulp Mills and of Paper and Paperboard Mills	(A)
24-2	Paper and Paperboard	(M)
24-3	Wood Pulp and Other Fibrous Materials	(A)
24-4	Paper and Paperboard	(A)
38-2	Containerboard. Inventories	(M)
38-3	Shipping Containers	(M)
38-4	Paperboard, Other than Containerboard	(A)

Basic Metals

1-6	Aluminum (Primary Production and Secondary Recovery)	(M)
1-7	Magnesium	(M)

Equipment and Supplies

Series No.		
5-3	Dry Cell Batteries (Production and Shipments by Type)	(Q)
3-1	Storage Batteries (Automotive Replacement Type, Shipments)	(Q)
M52A	Air Conditioning and Commercial Refrigeration Equipment (Semi-Annual)	
27-1	Safety Equipment	(A)

Miscellaneous

Series No.		
M26D	Asphalt and Tar Roofing and Siding Products	(M)
5-13	Enameled Ware	(A)
M75B	Porcelain Enameled Products	(M)
M15P	Cotton Linters	(A)
32-9	Toothbrushes (data on nylon fiber)	(Q)
16-1	Softwood Plywood	(M)
16-3	Hardwood Veneer and Plywood	(M)
4-3	Structural Clay Products	(M)
4-5	Concrete Masonry and Other Structural Concrete	(Q)
9-4	Glass Containers	(M)
32-6	Cotton and Rayon Woven Goods Finished Classified by type of finish and end use	(Q)

Foreign Trade Report Series

Series No.	Advance Summary Statistics (1941-44)	
FT-930	Individual commodities	Free
FT-950	Individual countries	Free
FT-960	Exports under the UNRRA program	Free
FT-970	U. S. Customs Districts and ports	Free
FT-975	Entrances and clearances of vessels in the foreign trade of the U. S.	Free

The following periodicals each comprise 12 monthly issues and a yearly issue (price marked "y"). Yearly subscription prices (13 issues) are marked "s." Order by number from the Census Bureau, with checks payable to treasurer of the United States. Following titles are abbreviated.

FT-100	Imports. Commodity totals	$0.10y	$1.25s
FT-110	Imports. Commodities, by countries	.45y	3.50s
	Optionally available in 3 separate sections:		
	FT-110A Animal and vegetable products	.15y	1.25s
	FT-110B Textiles, wood, minerals, et al.	.15y	1.25s
	FT-110C Metals, machinery, chemicals, et al.	.15y	1.25s
FT-120	Imports. Countries, by commodities	.45y	3.50s
	Optionally available in 3 separate sections:		
	FT-120A North & South America	.15y	1.25s
	FT-120B Europe	.15y	1.25
	FT-120C Asia, Australia and Africa	.15y	1.25
FT-400	Exports. Commodity totals	.10y	1.25s
FT-410	Exports. Commodities, by countries	1.50y	12.00s
	Optionally available in 10 separate sections:		
	FT-410A Animals and Animal Products	.15y	1.25s
	FT-410B Vegetable Food Products	.15y	1.25s
	FT-410C Vegetable Products, Inedible	.15y	1.25s
	FT-410D Textile Manufactures	.15y	1.25s
	FT-410E Wood and Paper	.15y	1.25s
	FT-410F Nonmetallic Minerals	.15y	1.25s
	FT-410G Metals and Manufactures	.15y	1.25s
	FT-410H Machinery and Vehicles	.15y	1.25s
	FT-410I Chemicals and Related Products	.15y	1.25s
	FT-410J Miscellaneous	.15y	1.25s
FT-420	Exports. Countries, by commodities	1.35y	11.00s
	Optionally available in 9 separate sections, each covering about 15 countries	.15y	1.25s
FT-415	Exports under Lend-Lease; commodities by countries	.15y	1.25s
FT-425	Same; countries, by commodities	.15y	1.95s
	Exports under UNRRA		
FT-416	Commodities, by countries		
FT-426	Countries, by commodities		
FT-800	U. S. Trade with territories and Possessions	.10y	1.25s
	Monthly Summary of Foreign Com.		
	1942 and 1943 yearly sub.		1.25s
	1944 and later not yet available.		

Special tabulations, by Customs Districts, are available on request (see text) for imports, exports, lend-lease, and U. S. trade with territories.

Older series of foreign trade reports (order from Supt. of Documents)

Foreign Commerce and Navigation of the U. S. (1941) $2.50
1942 ..... $3.50
1943 and later issues not yet available.

Current Statistical Service

Wholesalers' Sales, Inventories, and Credits (M)
Includes: Industrial Chemicals, Drugs and Sundries, Paper and Its Products, and Paints and Varnishes.
Covers: Sales and Inventories (with regional subtotals), Accounts Receivable and Collections (U. S. totals).

Outline Maps

U. S., showing states and counties, 30"x40" (Order from Census Bureau) ..... .15
States, showing counties and minor civil divisions (Order from Superintendent of Documents) ..... .15

California Research Elects Vesper as President

Election of Howard G. Vesper as president of California Research Corporation, Standard of California's research subsidiary, has been announced by R. G. Follis, president of Standard.

Mr. Vesper succeeds Ralph A. Halloran, one of the oil industry's best known research directors, who is retiring after 26 years spent as head of Standard's research activities. During that time he was in charge of many notable developments in petroleum processes.

Du Pont Makes New Organic Derivatives

E. I. du Pont de Nemours & Co., Inc. has begun semi-works scale production of several new organic derivatives in the explosives division of its Wilmington facilities.

Although plans call for the investigation of a number of organic syntheses involving nitration, nitrolysis, nitric acid esterfication, and nitric acid oxidation, output is currently limited to the cyclohexane derivatives—epsilon-caprolactum, cyclohexanone oxime, and nitrocyclohexane.

The lactam and oxime are expected to find their main use in textile processing, manufacture of corrosion inhibitors, insecticides, and pharmaceuticals. Nitrocyclohexane has been made available in experimental quantities for use in the preparation of rubber chemicals, resins, solvents, dyes, and emulsions.

Calco Lets Contracts For New Plant

Contracts for the major construction work of the new Willow Island, W. Va., plant of the Calco chemical division, American Cyanamid Co., have been awarded, S. C. Moody, general manager of the division, has revealed. Present plans for the plant call for the initial manufacturing buildings, warehouse and steam plant. The cost is expected to be approximately $3,000,000.

Let your HEAD take you

(The average American today has a choice of just going where "his feet take him", or choosing wisely the course to follow. Let's skip ahead 10 years, and take a look at John Jones—and listen to him . . .)

"SOMETIMES I feel so good it almost scares me.

"This house—I wouldn't swap a shingle off its roof for any other house on earth. This little valley, with the pond down in the hollow at the back, is the spot I like best in all the world.

"And they're mine. I own 'em. Nobody can take 'em away from me.

"I've got a little money coming in, regularly. Not much—but enough. And I tell you, when you can go to bed every night with nothing on your mind except the fun you're going to have tomorrow—that's as near Heaven as man gets on this earth!

"It wasn't always so.

"Back in '46—that was right after the war and sometimes the going wasn't too easy—I needed cash. Taxes were tough, and then Ellen got sick. Like almost everybody else, I was buying Bonds through the Payroll Plan—and I figured on cashing some of them in. But sick as she was, it was Ellen who talked me out of it.

" 'Don't do it, John!' she said. 'Please don't! For the first time in our lives, we're really saving money. It's wonderful to know that every single payday we have more money put aside! John, if we can only keep up this saving, think what it can mean! Maybe someday you won't have to work. Maybe we can own a home. And oh, how good it would feel to know that we need never worry about money when we're old!'

"Well, even after she got better, I stayed away from the weekly poker game—quit dropping a little cash at the hot spots now and then—gave up some of the things a man feels he has a right to. We didn't have as much fun for a while but we paid our taxes and the doctor and—we didn't touch the Bonds.

"What's more, we kept right on putting our extra cash into U. S. Savings Bonds. And the pay-off is making the world a pretty swell place today!"

The Treasury Department acknowledges with appreciation the publication of this advertisement by

CHEMICAL INDUSTRIES

INDEX *of* ADVERTISERS

INDEX *of* ADVERTISERS

"WE" – EDITORIALLY SPEAKING

A THOUGHT-PROVOKING comment on the philosophy of research was published recently in *The Research Viewpoint*:

"Sometimes we are regretful that research projects must be so sharply focussed. While this is the way to make speed and keep costs down, a more relaxed approach might develop unsuspected results.

"This observation is stimulated by a bit of dialogue we encountered the other evening while reading *Don Pedro and the Devil* by Edgar Maass:

"'Abu Amru bent his head to one side and replied, "Alchemy is something that requires a long time to learn."

"'"What do you mean by that?" asked Master Agrippa, taken aback.

"'"I mean that the adept must be intimately adjusted to the prime element before he can find it. If he thinks about gold, he can never succeed. For the prime element is not any alum, metal, salt, acid or earth. It is a great al-iksir, the krates, which was seen by the heathen and priest of Serapis in Alexandria in the house of Venus."'

"Modern research scientists do succeed, in spite of the fact that they are thinking about gold—in the form of profits. But some of the greatest research discoveries have been made in fields other than the one on which the work was concentrated. Perkin, for instance, was trying to produce quinine synthetically when he hit upon the mighty secret of coal tar dyes.

"Research needs a certain amount of latitude, to realize its fullest potentialities."

WE HAVE READ of the mythical milk pitcher from which an infinite quantity of milk could be obtained, but we didn't know that sugar behaved in the same fashion. From a recent governmental report: "According to Dr. E. Berl, of the Carnegie Institute of Technology, 110 tons of sugar can supply its usual amount of sugar and then be processed into 2,550 gallons of gasoline and 4,000 gallons of oil."

When you subtract sugar from sugar and make gasoline out of the obvious remainder—nothing—you've really got something!

ONE MANUFACTURER of certain equipment including hydraulic vises goes a little bit too far when he modernizes Latin spelling to give himself an advertising plug: In one of his recent letters he uses the term *vise versa*.

IT IS OUR confirmed suspicion that among the employees of our federal government are several frustrated speechmakers. In support of this contention we quote the preamble to a lyrical document entitled "Consumption of Ferrous Scrap and Pig Iron Reaches Record Low":

"The sudden and unexpected cessation of hostilities following the dramatic use of the atomic bomb is reflected in an abrupt change in the scrap iron and steel position. . . ."

Just a *slight* hint of anticlimax?

SO THAT WE might not disclose any names, we paraphrase a sentence which was recently called to our attention:

"Reorganization was one of Glotz' strong points in his 49 years' career in petroleum."

Let us pause for ten seconds of silent tribute to the men who provided the organizations for Glotz to reorganize!

If we really wanted to be corny, we could point out that 49 years is a long time to spend in petroleum—preserved in oil, as it were.

DIGGING AROUND in the dusty volumes of the past, we have uncovered a golden quotation by Huxley in his Essay on Hume:

"Since physical science, in the course of the last fifty years, has brought to the front an inexhaustible supply of heavy artillery of a new pattern, warranted to drive solid bolts of fact through the thickest skulls, things are better."

Now, with a scientific war behind us, and with minds of high and low estate alike wrestling with the problem of what to do with the atomic bomb, we have the temerity to ask, "Are they?"

IS IT BENZENE or benzol?—and not to be confused with benzine. And why must we be plagued with obsolete terms—such as sal ammoniac—which are as outmoded as the Elixir of Life and the Philosopher's Stone?

"Perhaps in the fullness of time an international conference of chemists will be convened in some country in which there is an abundance of food and plenty of cheap accommodation for visitors and some incautious chemist will . . . suggest that professional chemists of repute should consider whether the time has come for a revision of chemical terminological inexactitudes."

Fifteen Years Ago
From Our Files of Feb., 1931

Senate and House conferees appeared to be no nearer any common agreement on the Muscle Shoals question as the month closed despite several additional conferences. The main point of disagreement appears to be whether the nitrate plant should be used for making fertilizer only or whether it should be used for making fertilizer to a certain point of the plant's capacity and then nitrogen chemicals.

The Tennessee Corp. expansion program in East Tennessee is reported to be progressing rapidly. This company is spending approximately $2,000,000 for extensions, and the program is planned for completion this year.

Hercules Powder is completing a new experimental laboratory, costing more than $500,000 which will house the research facilities of the company.

General Electric is planning to build a $4,000,000 power plant at its works at Schenectady. Included will be the largest mercury vapor turbine ever built, with a capacity of 26,700 horsepower.

The Interstate Chemical Manufacturing Co. has been formed by William H. Rose, H. B. Van Cleve, and Clarence Miller, and has purchased the assets of the Interstate Chemical Co.

Thirty Years Ago
From Our Files of Feb., 1916

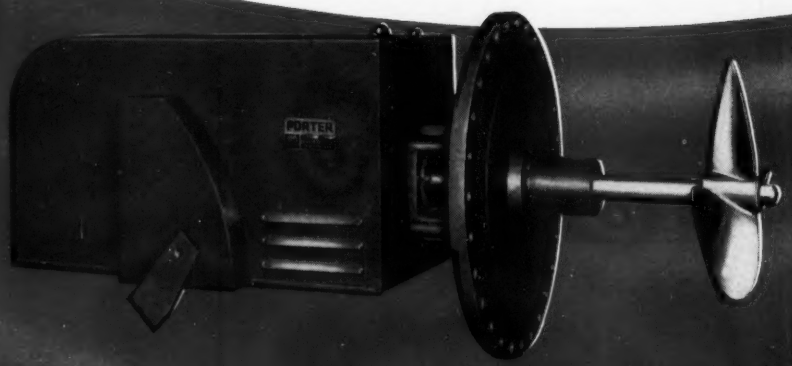
The Grasselli Chemical Company, of Cleveland, manufacturer of acids, has purchased a tract of 150 acres at Niles, Mich., and will erect a plant.

The United States Aniline and Chemical Co., St. Louis, just incorporated, will manufacture coal dyes and chemicals.

The Monsanto Chemical Company of St. Louis has filed a statement showing increase of its capital stock from $400,000 to $700,000.

Exports of chemicals, drugs, and similar commodities during 1915 show an enormous increase over those of the previous year, according to the latest statistics. During the year 1915 the total amount reached the enormous sum of $80,400,000, as against $29,000,000 in 1914.

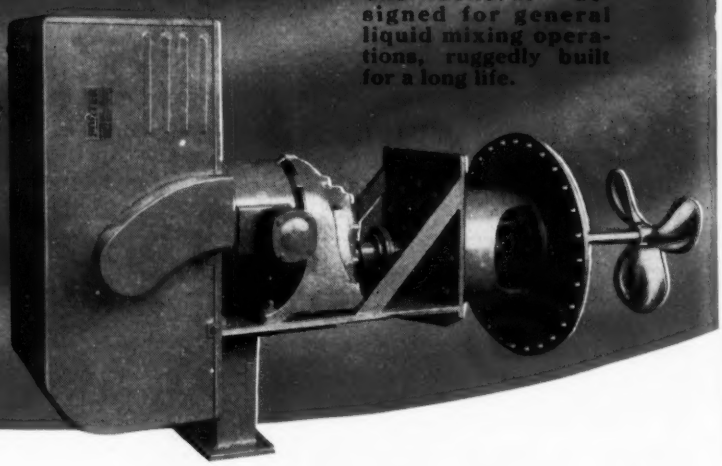
TWO GREAT MIXERS!



The *"Refiner"*—designed to meet refinery and chemical engineers' specifications, precision-built for liquids of low viscosity.

The *"General"*—designed for general liquid mixing operations, ruggedly built for a long life.

PORTER SIDE ENTERING AGITATORS



PORTER "Better Built" Equipment
Established 1866

Two mixers, each engineered for specific fields of application—both way ahead of the field in modern improved design, incorporating the Porter self-sealing shaft device for quick repacking from the outside.

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PATENTS AND TRADEMARKS

Abstracts of U. S. Chemical Patents

A Complete Checklist Covering Chemical Products and Processes

Printed copies of patents are available from the Patent Office at 10 cents each. Address the Commissioner of Patents, Washington, D. C., for copies and for general information concerning patents or trade-marks.

From Official Gazette—Vol. 579, No. 5—Vol. 580, Nos. 1, 2, 3 (Oct. 30-Nov. 20)—p. 636

*Petroleum

Removal of diolefins from hydrocarbon fluids which comprises contacting hydrocarbon fluids with solid reagent comprising solid adsorbent carrier selected from adsorbent clays, bauxite, charcoal, silica gel, and synthetic activated alumina impregnated with cuprous halide whereby a diolefin-cuprous halide complex is formed and retained on carrier. No. 2,386,354. Walter Schulze, John Billyer and Harry Drennan to Phillips Petroleum Co.

Removal of dissolved unsaturated hydrocarbon-cuprous halide addition compound from liquid aliphatic conjugated diolefin concentrate containing same and free from sulfur, nitrogen and oxygen compounds. No. 2,386,353. Walter Schulze to Phillips Petroleum Co.

Separation of (1) cyclic olefins, (2) aliphatic diolefins, (3) aliphatic olefins, and (4) paraffins, naphthenes, or aromatics, which comprises contacting mixture containing same with cuprous halide reagent. No. 2,386,335. Lloyd Morris to Phillips Petroleum Co.

Separation of cyclic olefins from hydrocarbon mixture containing same along with aliphatic diolefins, which comprises fractionally precipitating cuprous halide complex compounds from mixture. No. 2,386,334. Lloyd Morris to Phillips Petroleum Co.

Separation of components of hydrocarbon mixture comprising aliphatic conjugated diolefin and cyclic olefin by contacting mixture with a reagent comprising complex forming salt of a heavy metal of Groups I and II of periodic system to form in admixture solid complex compounds of metal salt and aliphatic conjugated diolefin and cyclic olefin by thermally reversible reaction, wherein solid complex compounds exhibit differing degrees of thermal stability. No. 2,386,333. Lloyd Morris to Phillips Petroleum Co.

Preparing catalyst comprising metal oxide supported on granular, porous and highly adsorptive catalyst carrier material. No. 2,386,518. John Upham to Phillips Petroleum Co.

Preparing catalyst comprising metal oxide supported on porous catalyst carrier material which comprises impregnating porous catalyst carrier material with hydrosol capable of yielding with alkalies a catalytically active metal oxide, etc. No. 2,386,499. James Owen to Phillips Petroleum Co.

Recovering gasoline constituents from natural gas comprising hydrocarbons ranging from methane to constituents in gasoline boiling range. No. 2,386,057. Frank Noble to Standard Oil Development Co.

Sustaining activity of reforming catalysts in process of reforming naphthenic naphthas. No. 2,386,050. Clinton Holder to Standard Oil Development Co.

Increasing recovery of heavy, viscous crude petroleum from subterranean deposits, which includes: (1) extracting petroleum from subterranean deposit (2) heating extracted petroleum to obtain a lighter fraction therefrom (3) reintroducing into deposit lighter fraction and (4) causing fraction to penetrate within deposit to decrease viscosity of residual heavy petroleum and to facilitate further recovery of such petroleum. No. 2,386,036. Roy Cross.

Breaking petroleum emulsions of water-in-oil type, which consists in subjecting emulsion to demulsifier, comprising a sub-resinous member of acidylated esters of an acylated polyglycol ether. No. 2,385,970. Melvin De Groote and Bernhard Keiser to Petrolite Corp. Ltd.

Breaking petroleum emulsions of water-in-oil type, by subjecting emulsion to demulsifier comprising non-volatile resultant of an esterification reaction between (A) a monocarboxy acid ester; and (B) a low molal alkyl ester of a polycarboxy acid. No. 2,385,969. Melvin De Groote and Bernhard Keiser to Petrolite Corp. Ltd.

Subjecting petroleum oil ranging from naphtha to heavy gas oil to cracking with a metal halide catalyst which has been spent for subsequent alkylation step, under severe conditions to form C_4 to C_8 paraffin hydrocarbons, etc. No. 2,385,806. Arch Foster to Phillips Petroleum Co.

Refining crude petrolatum to produce series of separate fractions therefrom. No. 2,387,171. John Morgan and Angus Blakey to Cities Service Oil Co.

Reacting low-boiling olefin and low-boiling isoparaffin to produce higher-boiling paraffins in presence of a hydrofluoride acid catalyst. No. 2,387,162. Maryan Matuszak to Phillips Petroleum Co.

Composition capable of ready dispersion in water to form stable aqueous emulsion comprising material selected from petroleum oils and waxes, lecithin, and ester derived from mannitan and high molecular weight fatty acid. No. 2,387,157. Robert Koppenhoefer to Socony-Vacuum Oil Co. Inc.

Obtaining high yields of motor fuel and low losses to gas and coke in catalytic conversion process wherein hydrocarbon vapors are contacted with catalyst comprising silica and metal oxide of alumina and magnesia. No. 2,387,088. Alex Blad and Llewellyn Heard to Standard Oil Co.

Gasoline and water separator comprising funnel-shaped body formed to provide an upper cylindrical portion having conical bottom wall open at its center, intermediate cylindrical portion depending from said bottom wall about its open center, etc. No. 2,387,035. Tyre Miller.

Alkylation of isoparaffin with olefin in presence of aluminum halide and hydrogen halide of middle halogens, wherein there is separated from conversion products gaseous mixture containing hydrogen halide and a paraffin, which comprises adding olefin to said mixture to form alkyl halide, and supplying same to alkylating step. No. 2,386,944. Bernard Friedman to Universal Oil Products Co.

* *Continued from Vol. 579, Nos. 1, 2, 3, 4.*

Patents Available for License or Sale

The Patent Office is regularly publishing a Register of Patents Available for Licensing or Sale. Patents concerning chemical products and processes appear below.

December 4, 1945

Pat. 2,038,071. Fluid Treating Device. Patented Apr. 21, 1936. Device made of paper, fibrous material, or molded from other material, for treating air, gas, etc., for purification and deodorization whereby a maximum area containing a reactive chemical is exposed (may be used in refrigerators or relatively small enclosed spaces). Corrugated sheet secured to flat sheet has all exposed surfaces provided with a chemical reactive which may be mixed with material during manufacture. Sheet is wound upon itself forming a compact, open cylindrical body enclosed by suitable container having perforations to permit circulation of air. (Owner) Patent Finance Corp., 9145 So. Leavitt St., Chicago, Ill. Groups 26—11; 28—89; 35—84. Reg. No. 636.

December 11, 1945

Pat. 2,221,378. Plastic and Process for Producing Same. Patented Nov. 12, 1940. Oil and tarry wastes resulting from the destructive distillation of wood are mixed with a cellulose ester and distilled to remove a portion of the volatile constituents at given temperatures. Examples and results given in patent. (Owner) Fred J. Heckel, 47 William St., Bradford, Pa. Groups 26—39; 28—11—34; 29—32; 36—11. Reg. No. 705.

December 18, 1945

Pat. 2,375,555. Camera. Patented May 8, 1945. Knife attachment within camera permits single exposures to be cut and removed from roll for developing without disturbing or exposing remainder of film giving camera advantage common to plate or film pack loaded cameras. Each section is cut off and automatically deposited in a light-proof, removable container. (Owners) Jasper S. Howard and Thomas D. Bishop. Address all correspondence to Jasper S. Howard, 113 Sixth St., Broderick, Yolo County, Calif. Group 39—12. Reg. No. 720.

Pat. 2,351,455. Thermometer Reader. Patented June 13, 1944. Attachment, having a vernier scale, for thermometer consisting of auxiliary panel positioned alongside thermometer panel and a magnifying glass mounted above the scales for reading fractional parts of a degree. (Owner) Dino J. Pratesi, 30 Ashley Blvd., New Bedford, Mass. Groups 32—29—39; 33—66; 39—11. Reg. No. 721.

Pat. 2,107,255. Method of Treating Carbonates. Patented Feb. 1, 1938. Vertical oven having an enclosed roasting chamber in which the material does not come into direct contact with products of combustion. Resulting gases are drawn off due to their specific gravities. Burners positioned about one-third the way up stack provide heating zones having varying temperatures. Material is dried at top then gradually lowered as a unit through the different zones. Reduced material is drawn off at the bottom by a rotating valve and deposited on a conveyor or dump cart. Condition of material may be viewed at different stages through peep holes. (Owner) Parker McComb, Box 1482, Monroe, La. Groups 33—11; 34—1. Reg. No. 731.

Pat. 2,383,946. Method and Apparatus for Fluid Contact. Patented Sept. 4, 1945. Mixing method to produce sulfonations, chlorinations, nitrations, etc., which consists of immersing a flexible, chemically resistant tubing into one of the liquids to be mixed. At the immersed end the tubing is porous, or braided, the other end being coupled to a gas or liquid supply which exerts pressure so as to produce a thrashing movement. Provides an economical method of mixing and in some cases eliminates the use of agitating gear. (Owner) Chester Tietig, 435 Reading Road, Cincinnati 2, Ohio. Groups 30—31; 35—69; 39—81. Reg. No. 732.

Pat. 2,372,991. Apparatus for Heating Fluids. Patented Apr. 3, 1945. Directional burners supply heat to a plurality of separate tubes inside a cylindrical casing lined with insulation and firebrick. A conical baffle diverts the rising combustion gases to render the heat more effective. Above this arrangement are two manifolds to which are connected inlet pipes; a single manifold positioned below has inlet and discharge connections. In the conversion of light hydrocarbons the heating, cooling, and mixing of two separate streams may be controlled individually to produce reactions, solutions, etc., of desired character. (Owner) Basic Chemical Corp., 4600 Chippewa St., St. Louis 16, Mo. Groups 32—59; 33—12—73; 36—19. Reg. No. 740.

(Continued on following page)

(Continued from preceding page)

Pat. 2,373,032. **Electrolytic Decomposing Gas Generator.** Patented Apr. 3, 1945. Generator to extract gases from water or other liquids to serve as fuel for an internal combustion engine. Consists of a hollow cylindrical tank with corrugated sides divided into three compartments, the intermediate compartment preventing a mixture of the hydrogen and oxygen obtained by the electrolysis of water. The gases are piped off into separate storage chambers. The whole is intended for ready connection to the engine of an automobile, boat, etc. Inventor claims apparatus takes relatively little room. (Owner) Basic Chemical Corp., 4600 Chippewa St., St. Louis 16, Mo. Groups 32—29; 33—72—73; 36—12—41. Reg. No. 741.

Pat. 2,331,824. **Process for Coating Pipe.** Patented Oct. 12, 1943. After water has been withdrawn and piping system thoroughly dried, "Bakelite" varnish or the like is forced into the system and excess withdrawn. When dried, varnish coating seals corroded portions of piping and does not affect taste of drinking water. May also be used as a protective coating for interior of brass piping prior to installation. For use in localities where water contains carbonic acid, etc. (Owner) William D. Buckingham, Box 537, Southampton, N. Y. Groups 28—11—83; 33—61; 34—31. Reg. No. 745.

Pat. 2,194,126. **Bubble Cap for Refractionating Towers.** Patented Mar. 19, 1940. Integrally formed, a dome covers a truncated conical tube or "candle" with radially disposed fins and a serrated top edge. A number of these are arranged to cover the perforations of the horizontal partitions of a refractionating tower used in the refining of petroleum. Deposits of sediments have little effect on the flow of fluid. Easily installed replaceable after cleaning. (Owner) Albert L. Schwandt, 4111 Homerlee Ave., East Chicago, Ind. Groups 33—22; 34—91. Reg. No. 746.

December 25, 1945

Pat. 2,205,043. **Iron Oxide Briquette.** Patented June 18, 1940. Produced by mixing comminuted iron oxides with a solution of diluted water-glass and a finely crushed calcareous material, such as limestone or dolomite; used in oxidizing or decarburizing molten metal in furnaces. Methods and quantities given in patent. (Co-owner) Ralph H. Steinberg, 836 W. 71st St., Chicago 21, Ill. Groups 28—99; 29—91. Reg. No. 754.

Pat. 2,305,197. **Flange.** Patented Dec. 15, 1942. Flange adapted for use with metal barrels, drums, containers, etc., which can be easily pressed into place and held without welding so as to be fitted with a cover making container leak-proof, etc. Consists of a retaining ring with annular laterally and inwardly turned portions which fit over a body ring and grip the lip of a container opening. Several modifications are shown which adapt the flange to containers requiring threaded or unthreaded covers. (Owner) Harold M. Sheridan, 4214 Spruce St., New Boston, Ohio. Groups 33—64—73. Reg. No. 781.

Pat. 2,073,578. **Method of Refining Hydrocarbon Distillates.** Patented Mar. 9, 1937. Reg. No. 786.

Pat. 2,174,510. **Method of Continuously Hydrofining Carbonaceous Vapors with Sulphur Sensitive Catalytic Surfaces.** Patented Oct. 3, 1939. Reg. No. 787.

The two patients listed above relate to the refining of hydrocarbon distillates, particularly to light petroleum distillates and those free or freed of asphaltic materials. The essential feature of this hydrogenation and/or desulphurization is the use of metallic catalysts, such as nickel, together with low pressures and comparatively low temperatures, whereby unstable sulphur compounds are removed or converted into less troublesome compounds, without loss of yield. The process eliminates wholly or partially the use of sulphuric acid and may be used alone or in conjunction with the old methods of refining. Process recited in patent. (Owner) Marion H. Gwynn, Mountain Lakes, N. J. Groups 28; 29.

Pat. 2,191,464. **Process for Activating Catalytic Surfaces.** Patented Feb. 27, 1940. Reg. No. 788.

Pat. 2,319,453. **Process for Activating Catalytic Surfaces.** Patented May 18, 1943. Reg. No. 789.

The two patents listed above relate to a highly active and black fixed catalytic surface useful in the hydrogenation of oils, etc., may be prepared from cobalt or nickel, etc., which is treated while in a porous state to form an adherent surface layer which is moderately catalytic. The surface is then oxydized until highly catalytic by means of a strongly alkaline aqueous solution of hypobromite or hypohalite. The product is useful in hydrofining operations. 2,319,453 activates the catalytic surfaces by means of chlorine dioxide and other halites employing higher temperatures and varying concentrations of the alkali and acid solutions. (Owners) Marion H. Gwynn, Mountain Lakes, N. J. Groups 28; 29.

Pat. 2,270,874. **Method of Activating Catalytic Surfaces.** Patented Jan. 27, 1942. To accomplish the reactivation of the porous metallic catalyst a vapor of nitric acid is distributed over the surface to form a nitrate. The vapor is withdrawn and by heating, the nitrate is decomposed to a black oxide for use in hydrofining. (Owner) Marion H. Gwynn, Mountain Lakes, N. J. Groups 28; 29. Reg. No. 790.

Pat. 2,315,518. **Method of Activating Catalytic Surfaces.** Patented Apr. 6, 1943. Achieves reactivation of a catalytic surface by peroxidation at the anode in an electrolytic bath of an aqueous solution of a hydroxide of calcium, barium, etc., to form a higher oxide on the catalytic surface. Several examples are given in the patent. (Owner) Marion H. Gwynn, Mountain Lakes, N. J. Groups 28; 29. Reg. No. 791.

January 1, 1946

Pat. 2,041,023. **Measuring Valve.** Patented May 19, 1936. For discharging measured quantities of lubricant to various points. Lubricant flows through duct to end of cylinder, forcing piston downwardly against compression spring, which acts as reciprocating valve. (Owner) Samuel S. Roberts, Roberts Equipment Co., 333 S. Pacific Ave., Pittsburgh, Pa. Groups 33—66—73; 35—42—59—69. Reg. No. 807.

Pat. 1,870,068. **Lubricating Valve.** Patented Aug. 2, 1932. Lubricant flows up feed-groove filling space above piston and into ducts and equalizing groove. Hydrostatic pressure forces piston down, pressing lubricant into outlet port. Adjusting screw regulates quantity supplied. Indicates whether or not supply or discharge pipes are obstructed. (Owner) Samuel S. Roberts, Roberts Equipment Co., 333 S. Pacific Ave., Pittsburgh, Pa. Groups 33—59—66—73; 38—31. Reg. No. 810.

Pat. 2,367,971. **Method of Producing a Detergent Composition.** Patented Jan. 23, 1945. Water soluble cleansing agent produced by mixing to gelatinous form, sodium hydroxide, sodium silicate, borax, and hydrogen peroxide and pouring on surface to dry, then finely grinding. May be mixed with powdered soap or the like. Proportions given in patent. (Owner) John J. Spiegler, 2 Hillside Ave., Newark 8, N. J. Groups 28—34—41—89—93. Reg. No. 811.

Pat. 2,239,402. **Liquid Level Indicating Implement for Tanks.** Patented April 22, 1941. Consists of conventional dipping stick arranged in tube for protecting stick from splashing oil. Upper end is enlarged and has compression spring attached thereto holding it is in raised position above oil level, lower end of spring resting on crank case. Oil level is checked by pushing stick down and withdrawing. Wiping stick is unnecessary. (Owner) Eric G. Sachs, 300 Main St., White Plains, N. Y. Groups 33—59; 35—43; 38—11—31. Reg. No. 815.

Pat. 2,322,026. **Gas Mixer.** Patented June 15, 1943. Comprises a cylindrical body made of suitable material having a concave end and an opposite convex end with well between provided with closure and inlet and outlet passages. Automatically mixes fuel gas with air and moisture. Controls and filters gas through conduits. Pressure created by gas forces mixture through outlet pipe into gas feed pipe. (Owner) Frederick T. Jaeckel, 613 North 59th St., Wauwatosa 13, Wis. Groups 25—92; 30—32; 33—62—65—69—73; 39—81. Reg. No. 825.

Apparatus for purifying mineral oil of low water content. No. 2,386,941. Harold Eddy to Petrolite Corp. Ltd.

In drilling and controlling wells in which mud is circulated in bore hole comprising, treating mud with an agent containing metaphosphate radical. No. 2,387,694. Truman Wayne.

Contacting hydrocarbons under conversion conditions with particles of homogeneous composition consisting of silica and alumina prepared by method comprising forming clear hydrosol, etc. No. 2,387,596. Milton Marisic to Socony-Vacuum Oil Co. Inc.

Method for logging wells drilled for oil which comprises collecting samples of formation traversed at successive depths, incorporating each sample into half cell the potential of which is sensitive to addition of minute amount of reducing component thereto. No. 2,387,513. Claude Hocott to Standard Oil Development Co.

Subjecting normally liquid saturated naphtha hydrocarbon in absence of unsaturated hydrocarbons to action of aluminum halide isomerization catalyst in presence of hydrogen halide such that isomerization to normally liquid naphtha hydrocarbon occurs. No. 2,387,508. Arthur Goldsby to The Texas Co.

Catalytically cracking hydrocarbons wherein hydrocarbon reactants are heated and passed in contact with active catalyst, catlyst being periodically regenerated to restore its activity, etc. No. 2,387,477. Charles Thomas to Universal Oil Products Co.

Diesel fuel having in admixture to decrease ignition delay period of fuel, 2,2-dinitropropane. No. 2,387,403. John McCracken and Edwin Nygaard to Socony-Vacuum Oil Co. Inc.

Producing gasoline which comprises passing hydrocarbon oil boiling above gasoline through cracking zone. No. 2,387,309. William Sweeney to Standard Oil Development Co.

Diesel fuel having in admixture therewith a halogen-free dinitro paraffin, to decrease ignition delay period of fuel. No. 2,387,279. John McCracken to Socony-Vacuum Oil Co. Inc.

Purifying low water content mineral oils to remove water-soluble or water-wettable impurities which oils also contain naturally-occurring emulsifying agents tending to stabilize droplets of fresh water dispersed in oil. No. 2,387,250. Harold Eddy to Petrolite Corp. Ltd.

**Photographic*

Anti-static photographic film comprising cellulose ester support having sensitive emulsion layer and layer of organic acid ester of cellulose containing aluminum sulfate. No. 2,386,627. Gale Nadeau and Clarence Hunter to Eastman Kodak Co.

Sensitizing and protecting metal plates. No. 2,386,602. Victor Gioseffi to Eastman Kodak Co.

Photographic element consisting of transparent base, light sensitive silver halide layer imposed on base, a water permeable layer on said layer and water-permeable layer embodying color-former free from silver and silver salts imposed on last, said second layer being of such thickness that no coupling coaction takes place between silver halide layer and color-former. No. 2,386,167. Otis Murray to E. I. du Pont de Nemours & Co.

Development of reducible silver salt emulsion to produce a colored image which process comprises developing emulsion by means of aromatic amino-developing agent containing a primary amino group on conjunction with a color-former, etc. No. 2,387,145. Bruno Gluck to Dufay-Chromex Ltd.

Solution for coating printing plate comprising, a sensitizer, casein, gelatin, and borax. No. 2,387,056. Arthur Buck and Joseph Miller to Buck X-Ograph Co.

Preventing reticulation of photographic emulsions including a silver halide, comprising fixing image in fixing bath having alkalinity same as that of alkaline developer and alum to buffer alkali. No. 2,387,000. James Alburger to Radio Corp. of America.

Reversal process for exposed film. No. 2,386,858. Herbert Houston to The Houston Corp.

Reversal process for exposed film. No. 2,386,857. Herbert Houston to The Houston Corp.

* *Continued from Vol. 579, Nos. 1, 2, 3, 4.*

From Official Gazette—Vol. 579, No. 5—Vol. 580, Nos. 1, 2, 3 (Oct. 30-Nov. 20)—p. 638

*Polymers

Preparing infusible, heat non-convertible, homogeneous, plastic mass, which comprises mechanically working together an organic, solvent-soluble, non-oil-modified condensate of a saturated, aliphatic, dicarboxylic acid and a polyhydric alcohol and hydrocarbon-soluble condensate of carbamides and aminotriazines, formaldehyde and aliphatic alcohol. No. 2,386,744. Frederick Myers to The Resinous Products & Chemical Co.

Making rubber-like masses which comprises polymerizing a butadiene and a vinyl compound in aqueous emulsion in presence of catalyst from hydrogen peroxide and hydrogen peroxide generating compounds and acetaldehyde. No. 2,386,735. Alvin Borders, William Wolfe, and Harold Osterhof and Charles Walton to Wingfoot Corp.

Regenerating rubber-like cured butadiene copolymer of class produced with styrene and with acrylonitrile which comprises cooking with swelling agent which contains ethyl alcohol as a plasticizer. No. 2,386,707. Derwin Moore and Harry Thompson to Wingfoot Corp.

Aqueous dispersion of polymers of ethylene of horny consistency and polyisobutylene. No. 2,386,674. Colin Flint and Robert Clarke to Imperial Chemical Industries Ltd.

Producing thread-like structure of rubber hydrohalide which comprises compacting solvent-free strip of rubber hydrohalide throughout its length and stretching it to increase tensile strength. No. 2,386,666. Ray Dinsmore to Wingfoot Corp.

Rubber-like copolymer containing butadiene-1,3 acrylonitrile and methyl methacrylate, latter to increase workability. No. 2,386,661. Albert Clifford and William Wolfe to Wingfoot Corp.

Spinning roll cover, being vulcanized fiber contacting surface layer of pitted structure consisting of a resilient composition comprising acrylic nitrile and butadiene copolymer, and fine particles of granular rubber substance. No. 2,386,583. Henry Bacon to The Dayton Rubber Manufacturing Co.

Making isoprene by jointly distilling and thermally decomposing terpene hydrocarbons on incandescent element in reaction tone. No. 2,386,537. Carlisle Bibb to Newport Idustries, Inc.

Mixture comprising copolymer of olefin and conjugated diolefin, paraquinone dioxime and a 1,3-epoxybenzofurazane, said copolymer having a degree of unsaturation less than ten percent of that of natural rubber. No. 2,386,427. Samuel Breck to United States Rubber Co.

Polyvinyl chloride plasticized with a mixed ester of general formula described in patent. No. 2,386,405. Edmund Meincke to American Cyanamid Co.

Solid, macromolecular, hydrolyzed interpolymer of ethylene with a vinyl ester of organic monocarboxylic acid. No. 2,386,347. John Roland, Jr. to E. I. du Pont de Nemours & Co.

Resin consisting of reaction product of resinous compound from natural resins having acid numbers between 100 and 200, the glycerol esters and the calcium and zinc salts of such resins with liquid product prepared by condensing lower saturated aliphatic ketone and aldehyde from straight chain lower aliphatic aldehydes and furfural. No. 2,386,321. John Kroeger and Harry O'Connor to Fred'k H. Levey Co. Inc.

Preparing improved emulsions of or containing organic polysulphides which comprises mixing aqueous solution of inorganic polysulphide with aqueous emulsion of aliphatic organic dihalogen compound and obtaining reaction product in form of flocculate. No. 2,386,287. John Blanco, Albert Neale, and Douglas Twiss to Dunlop Rubber Co. Ltd.

Safety glass composition, resinous synthetic plastic materials containing plasticizers which are triethylene glycol esters of unsaturated fatty acids halogenated to substantial degree. No. 2,386,534. George Barsky to Wecoline Products, Inc.

Plasticizer for polystyrene resins, said material being mixture of low molecular weight hydrocarbons and having miscibility and compatibility with styrene resins. No. 2,386,507. Denis Chesselden Quin.

Body comprising microcrystalline linear polymer having permanent molecular orientation produced by application of directional stress to reaction product produced by condensing by heating mixture including monoalkylolamine and aliphatic dicarboxylic acid. No. 2,386,454. Carl Frosch to Bell Telephone Laboratories, Inc.

Recovering from aqueous emulsion, rubbery polymer which is composed of chemically combined aliphatic conjugated diolefine and which is cohesive when permitted to stand without agitation while wet with water, etc. No. 2,386,449. Robert Dreisbach to The Dow Chemical Co.

Making rubbery material by co-polymerization in aqueous emulsion of mixture of unsaturated organic compounds, including conjugated aliphatic diolefine and unsaturated ketone, which consists in carrying polymerization out in presence of polychlorinated hydrocarbon, which is stable in presence of boiling water, and under exposure to actinic light. No. 2,386,448. Robert Dreisbach to The Dow Chemical Co.

Rubber-like material comprising co-polymer of polymerizable organic compounds including, first, diolefinic compound selected from aliphatic conjugated diolefines and 2-chloro-butadiene-1.3, and, secondly, unsaturated ketone. No. 2,386,447. Robert Dreisbach to The Dow Chemical Co.

Rubber-like plastic mass comprising rubber-like product of polymerization of 1,3-butadiene with polymerizable material comprising acrylonitrile mixed with a mixed ester of general formula described in patent. No. 2,386,443. Arnold Davis to American Cyanamid Co.

Making plastic material containing protein by adding, as coagulant, dry protein to cactus juice until juice is coagulated. No. 2,386,264. Pearlie Roberts; thirty-six per cent to himself, fifteen per cent to himself as trustee; thirty-four per cent to Arthur Squyres; and fifteen per cent to said Squyres as trustee.

Producing composite articles of rubber and metal, wherein rubber compound is firmly adhered to metal which under vulcanizing conditions is easily attacked by ingredients of rubber compound. No. 2,386,212. Thomas Griffith to The Honorary Advisory Council for Scientific and Industrial Research.

Treating strand of material of given color having cellulose acetate coating

thereon which has been made undesirably opaque by excess drying, comprising passing coated strand through a bath of mineral oil absorbable into coating to render coating desirably transparent. No. 2,386,148. Charles Smith to Western Electric Co. Inc.

Bonding rubber to solid non-rubber surfaces which comprises applying to surface a base coat consisting of soluble reactive phenol-aldehyde resin, applying to base coat an adhesive composition comprising rubber, soluble reactive phenol-aldehyde resin, and oxidizing agent selected from tetrachloroquinone, para-benzo-quinone, benzoyl peroxide, etc., and thereover applying vulcanizable rubber stock, and heating assembly. No. 2,386,-112. Henry Harkins to United States Rubber Co.

Heating element adapted to develop heat when connected to source of electric energy comprising semi-conducting film of polymeric organic non-conducting composition containing alkyd resin, polyvinyl acetal resin and carbon black. No. 2,386,095. Donald Edgar and David Sullivan to E. I. du Pont de Nemours & Co.

Preparing polymer which comprises treating a saturated bicyclic terpene with a catalyst. No. 2,386,063. Alfred Rummelsburg to Hercules Powder Co.

Unsaturated esters and polymers thereof. No. 2,385,934. Irving Muskat and Franklin Strain to Pittsburgh Plate Glass Co.

Unsaturated alcohol esters of triethylene glycol bis (acid carbonate) and polymers thereof. No. 2,385,933. Irving Muskat and Franklin Strain to Pittsburgh Plate Glass Co.

Unsaturated esters and polymers thereof. No. 2,385,932. Irving Muskat and Franklin Strain to Pittsburgh Plate Glass Co.

Unsaturated esters and polymers thereof. No. 2,385,931. Irving Muskat and Franklin Strain to Pittsburgh Plate Glass Co.

Forming adherent cellular layer of plastic upon glass surface, which comprises coating surface with hydrolyzed ethyl silicate, then spraying solution of vinyl acetal resin in ethyl alcohol. No. 2,385,921. John Jordan to Pittsburgh Corning Corp.

Reducing breakage of cold-drawable filamentous structures composed of synthetic linear polyamide which comprises preparing composition containing said polyamide and a finely divided, inert material homogeneously dispersed therein, spinning filamentous structure from said composition and cold-drawing said structure. No. 2,385,890. Edgar Spanagel to E. I. du Pont de Nemours & Co.

Supporting cast material characterized by hardness, strength, rigidity and toughness and by ready moldability at higher temperatures comprising mixture containing resinous base material which is conjoint polymer of vinyl chloride and vinyl acetate, and plasticizing material which is mixture of triphenyl phosphate and tri(paratertiarybutylphenyl) phosphate. No. 2,385,879. Carl Patton to Carbide and Carbon Chemicals Corp.

In a cushion, a compressible and expansible cushioning body, comprising shaped pad of resilient fibres of a synthetic thermoplastic material. No. 2,385,870. Walter Lashar and Richard Warren, Jr.

Manufacture of protein plastic which comprises precipitating fibrinogen from blood plasma, drying precipitated fibrinogen and mixing with another protein selected from albumin and globulin and with plasticizer, and setting resulting mixture under heat and pressure. No. 2,385,803. Edwin Cohn and John Ferry to Research Corp.

Manufacture of plastics which comprises removing corpuscles from blood while preventing clotting of fibrinogen constituent, treating resulting plasma for precipitation of fibrinogen, drying precipitated fibrinogen and mixing it with a plasticizer, molding mixture and setting same by heat. No. 2,385,802. John Ferry to Research Corp.

Vinyl halide resin plasticized with dicyclopentyl adipate. No. 2,387,111. Franklin Bent to Shell Development Co.

Concentration of aliphatic conjugated diolefin from hydrocarbon mixtures containing same and other close-boiling more saturated aliphatic hydrocarbons which comprises extracting mixture with selective solvent for diolefin, said solvent being alkyl N-substituted lower fatty acid amide. No. 2,386,927. James Boyd, Jr. to Phillips Petroleum Co.

Resin prepared by heating mixture consisting of shellac and urea. No. 2,387,049. Henry Bassford, Jr. to U. S. Shellac Importers Association, Inc.

Hard resinous light-colored composition formed by reacting diphenyl ether with a chlorinated petroleum wax containing 40% to 60% of chlorine in presence of a Friedel-Crafts catalyst, adding metallic zinc and water to reaction product to decolorize same and catalytically hydrogenating product. No. 2,387,037. Ferdinand Otto and Orland Reiff to Socony-Vacuum Oil Co. Inc.

Producing from plastic material a mold pressed article such as a button provided with a plurality of holes. No. 2,387,034. Sylvester Milano to Maryland Plastics, Inc.

Heating fusible polymer of diallyl diglycolate under pressure to render polymer mass coherent. No. 2,386,999. David Adelson and Hans Dannenberg to Shell Development Co.

Making synthetic thermoplastic spongy material by forming pores in plasticized high molecular weight linear polymer, said polymer being made by polymerization of vinyl chloride. No. 2,386,995. Voorhis Wigal to The B. F. Goodrich Co.

Treating glass-plastic sandwich in manufacture of laminated safety glass to prevent blow-ins during autoclaving. No. 2,386,980. Joseph Ryan to Libbey-Owens-Ford Glass Co.

Permanently flattening sheet of polymerized styrene which is so thin that it normally curls up, which comprises subjecting sheet to 170° F. while placed between plates to prevent cold flow of sheet material, and causing sheet gradually to cool. No. 2,386,976. John Putnam to The Reece Button Hole Machine Co.

Making thermoplastic composition of enhanced resistance to swelling by organic solvents which comprises treating conjugated butadiene polymer rubber with member of phosphorus pentachloride and phosphorus pentabromide to partially halogenate rubber and combine phosphorus therewith. No. 2,386,968. George Martin to Monsanto Chemical Co.

High-frequency electrostatic heating of plastics. No. 2,386,966. Howard MacMillin to The Hydraulic Development Corp. Inc.

Producing synthetic rubber by steps including emulsion polymerization of monomeric material including aliphatic conjugated diolefin to yield latex of synthetic rubber containing volatile organic material including unpolymerized monomeric material, improvement which comprises creaming said latex and degassing creamed latex. No. 2,386,931. Frank Carpenter to Phillips Petroleum Co.

Articles transparent to visible light characterized by being opaque to ultra-violet light radiations and exhibiting bluish fluorescence under ultra-violet light, said articles consisting of plastic cellulose derivative material having incorporated therewith cellulose derivative material of compound selected from fluoranthene and alkyl and aryl substitution derivatives. No. 2,386,855. William Horback to Celanese Corp. of America.

Forming polymeric product, which consists in subjecting mixture of dihydric alcohol and a dihydrocarbon silicon compound of formula described in patent, to heating. No. 2,386,793. William Hanford to E. I. du Pont de Nemours & Co.

Synthetic rubber latex prepared by polymerization of a butadiene-1,3 hydrocarbon in aqueous emulsion containing, as emulsifying agent, a colloidal electrolyte selected from water-soluble soaps of saturated higher fatty acids, alkali metal alkaryl sulfonates, another emulsifying agent which is water-soluble and non-ionizable long-chained organic compound selected from polyvinyl alcohol and polyether alcohols. No. 2,386,764. Benjamin Zwicker to The B. F. Goodrich Co.

Preserving freshly-collected latex which comprises treating latex within eighteen hours after collection by adding alkaline material and also dye selected from azo dyes, nitroso dyes and triphenyl methane dyes. No. 2,386,756. William Stewart to The B. F. Goodrich Co.

Mounting an indicia containing sheet upon backing by means of intermediate medium of polymerized vinyl ester which includes applying solvent composed mainly of isopropyl alcohol to polymerized vinyl ester, etc. No. 2,387,695. George Louis Weller, Jr.

Production of resinous felted fibrous composition which comprises providing fibrous stock of pulp fibres in mixture with powdered thermoplastic resin, said resin consisting of residue low in abietic acid remaining after separation of refined rosin high in abietic acid from resinous material obtained by extraction of pine wood with a solvent, etc. No. 2,387,683. Herman Richter and Harold Gillette to Federal Electric Co. Inc.

Safety-type glass interlayer comprising polyvinyl butyral resin plasticized with tributylidene of sorbitol. No. 2,387,662. William Holst to Atlas Powder Co.

Formed film-coated article shaped by deformation of metallic body coated with dried film of composition comprising wax-like material and benzene-soluble resinous polymer of material having resin-forming content thereof one of (a) cyclopentadiene and (b) cyclopentadiene admixed with methyl cyclopentadiene. No. 2,387,626. Alger Ward to The United Gas Improvement Co.

Copolymerization of methyl cyclopentadiene and cyclopentadiene. No. 2,-387,624. Samuel Trepp to The United Gas Improvement Co.

Heat stable compositions consisting of solid high polymer halogen-containing substance selected from chloro rubber, polyvinyl chloride, chlorinated polyvinyl chloride and polymeric as-dichloroethylene, an alkaline carbonate and alcohol selected from dodecyl alcohol, octadecyl alcohol, etc. No. 2,387,571. Hans Fikentscher and Richard Roehm.

Polymerization of olefinic materials in presence of catalyst comprising complex formed by reacting aluminum chloride with nitromethane, step which comprises carrying out reaction in presence of methyl chloride as solvent for complex catalyst. No. 2,387,543. Robert Thomas and Joseph Nelson to Jasco, Inc.

Modifying properties of linear, active hydrogen containing macromolecular polymers containing recurring intralinear carbonamide and carboxylic acid ester groups which comprises reacting same with cyclic anhydride of organic dicarboxylic acid. No. 2,387,530. William Prichard to E. I. du Pont de Nemours & Co.

Making modified product of action of organic phosphine halide on a rubber. No. 2,387,521. George Martin to Monsanto Chemical Co.

Polymer composition of increased stability against breakdown by depolymerization, comprising high molecular weight, saturated, linear polymeric hydrocarbon normally resistant to oxidation but having tendency to depolymerize and organic stabilizing compound cotaining thiocarboxyl function. No. 2,387,518. Irving Lightbown and William Sparks to Jasco, Inc.

Forming copolymer by copolymerization of compound of formula R=CH₂, etc. No. 2,387,517. Charles Kraus to Jasco, Inc.

New plastic composition comprising admixture of rubber-like polymer selected from polymers of butadiene-1,3, polymers of 2-chlor butadiene-1, 3 copolymers of butadiene-1,3 and styrene and copolymers of butadiene-1,3 and acrylic nitrile and a rubber-like vulcanizable oil resistant plastic obtained by heating a rubber with crude aryl phosphine halide. No. 2,387,502. Paul Downey to Monsanto Chemical Co.

Hydrocarbon oil having incorporated oil-soluble polymeric N-aliphatic acrylamide having molecular weight of 1000. No. 2,387,501. Melvin Dietrich to E. I. du Pont de Nemours & Co.

Isobutylene-diolefin polymer characterized by molecular weight within 10,000 to 250,000 prepared from isobutylene and diolefin by low temperature polymerization with Friedel-Crafts catalyst in combination with molecular weight protective agent comprising para-hydroxy phenyl morpholine. No. 2,387,499. William Daly to Jasco, Inc.

Improving processing characteristics of butadiene-styrene interpolymers containing styrene which comprises incorporating in interpolymer, o-sulfobenzoic anhydride. No. 2,387,481. John Vincent to E. I. du Pont de Nemours & Co.

Copolymers comprising a butadiene and alpha alkyl acrylonitrile containing five carbon atoms in molecule polymerized together. No. 2,387,385. Albert Clifford to Wingfoot Corp.

Malodorant-free plastic polymerized chloroprene dissolved in organic solvent, said composition characterized by resistance to thickening and gelling and by presence of sodium sulphanilate. No. 2,387,338. Alexander Macdonald to B. B. Chemical Co.

Polymerizing sugars which comprises: incorporating with sugar, as catalyst, a neutral metal salt; and heating sugar under anhydrous conditions at polymerizing temperature above melting point of sugar but below decomposition point. No. 2,387,275. Gerald Leuck to Corn Products Refining Co.

Producing heat-polymerized hydrocarbon resin from hydrocarbon oil physically separated from tar produced in vapor phase pyrolysis of petroleum oil. No. 2,387,259. Edwin Hall and Howard Batchelder to The United Gas Improvement Co.

Polymerizing separately prepared permanently fusible acid catalyzed phenol-formaldehyde resin by heating mixed with a fusible melamine-formaldehyde resin. No. 2,387,256. Frank Groten to American Cyanamid Co.

Producing hydrocarbon resin from hydrocarbon oil which has been physically separated from tar produced in vapor phase pyrolysis of petroleum oil. No. 2,387,237. Waldo Ault to United Gas Improvement Co.

Preparation of shaped plastic composite material having high resistance to shattering from bullet impact, which comprises molding into three-dimensional shape a composite material comprising layer of soft plastic material, having embedded therein open mesh wire fabric the wires of which have crimps along length, and a layer of harder plastic material. No. 2,387,227. Bjorn Andersen and Ernest Schweizer to Celanese Corp. of America.

*Process and Methods

Distillation of difficultly separable components in distillation unit oper-

ating under internal pressure, which pressure may be variable, wherein it is desired to obtain accurate measurements which otherwise would be effected by said internal pressure. No. 2,386,601. Webster Fisher to Eastman Kodak Co.

Recovering acidic gases from mixture constituting fuel gases. No. 2,-386,359. Fredrick Schreiber.

Removing dissolved copper compounds in form of cuprous salt-unsaturated hydrocarbon complexes from liquid low-boiling aliphatic diolefin hydrocarbon concentrates consisting of low-boiling aliphatic diolefin hydrocarbon and simultaneously protecting concentrate against oxidation which comprises contacting with reagent consisting of hydrogen sulfide, methyl mercaptan and ethyl mercaptan, etc. No. 2,386,272. Walter Schulze to Phillips Petroleum Co.

Burning of carbonaceous material from finely divided solid contact material by oxygen-containing gas in a regenerating zone, etc. No. 2,386,-491. Rulon McOmie to Shell Development Co.

Continuously contacting gas or vapor with recycled finely divided contact agent. No. 2,386,169. Norman Peery to Shell Development Co.

Method for sterilizing including sealing unsterile material into vapor-permeable container with solution of antiseptic in volatile organic solvent, and diffusing solvent thru walls of container. No. 2,386,157. Charles Barthen, Joel Peterson and Leslie McClintock to White Laboratories, Inc.

Method and apparatus for continuous analysis of organic mixtures while in motion and for control of systems comprising such mixtures. No. 2,-386,831. Norman Wright to The Dow Chemical Co.

Analyzing mixture comprising a heteratomic compound to determine proportion in mixture which comprises exposing mixture to infrared light, directing light transmitted through mixture onto two different and separate substances capable of absorbing infrared light, etc. No. 2,386,-830. Norman Wright to The Dow Chemical Co.

Continuous separation of a liquid from a liquid composition containing plurality of component substances comprising passing liquid composition into contact with one side of a semi-permeable membrane comprising a non-fibrous organic plastic pellicle in gel state, the other side of which membrane is exposed to a closed gaseous atmosphere unsaturated with said liquid. No. 2,386,826. Roger Wallach and Justin Zender to Sylvania Industrial Corp.

Separation of undesired non-aromatic hydrocarbons from raw material mixture containing non-aromatic hydrocarbons together with aromatic hydrocarbons boiling below 150° C., comprising feeding hydrocarbon mixture with 2-component azeotropic distillation agent consisting of aliphatic alcohol and water into a fractionating column having a stripping section and a rectifying section, etc. No. 2,386,755. Henry Spiers to Woodall-Duckham (1920) Ltd.

Analyzing mixed gases or vapors, which comprises (a) producing electric field between electrodes exposed to mixture of gases to be identified to remove fortuitous ions from gas, (b) ionizing gas near one electrode of said field, (c) reversing direction of field to cause ions to travel from said electrode through different distances according to respective ionmobilities, (d) producing electric field transverse to said travel of ions, (e) collecting ions from group or groups on an electrode, and (f) measuring charge imparted to electrode. No. 2,387,550. Louis Theodore Winkler.

Conducting series of alternate reactions in contact with porous solid body on each side of which endothermic and exothermic reactions are alternately performed, improvement which comprises conducting exothermic reaction by contact of exothermic reactants with one side of sheet of porous glass. No. 2,387,454. Milton Marisic to Socony-Vacuum Oil Co Inc.

Catalytic conversion process. No. 2,387,378. I. Louis Wolk to Phillips Petroleum Co.

Operation of plants for reactions promoted by catalysts operated alternately on-stream and in regeneration with catalysts disposed in plurality of converters divided into groups for sequential on-stream periods to permit continuous production, method of isolating converters for repairs. No. 2,387,267. Eugene Houdry to Houdry Process Corp.

*Specialties

Non-hardening, permanently tacky, adhesive composition, containing rubber and substance selected from gutta resin and balata resin. No. 2,386,-696. Joseph Lloyd to J. Mandleberg & Co. Ltd.

Permanent waterproofing product comprising reaction product of (a) wax selected from montan, candelilla, carnauba, and beeswax, (b) chloride selected from phosphorus trichloride, phosphorus pentachloride, sulfuryl chloride, and thionyl chloride, (c) long chain aliphatic nitrile, and (d) aldehyde, and which product reacted with tertiary amine. No. 2,386,-631. Raymond Pingree to Warwick Chemical Co.

Forming drawing surface which comprises coating transparent cellulose acetate sheet with solution of grounded glass, cellulose acetate, gelatin, sodium sulfate, water, methyl cellosolve, acetone, methanol, and acetic acid. No. 2,386,626. Gale Nadeau, Edwin Hilborn and Clarence Hunter to Eastman Kodak Co.

Homogeneous bituminous digestion product having low temperature-susceptibility factor comprising tar product from coal tar, water-gas tar, their oils and pitches, and asphaltic pyrobituminous material; non-mineral constituents, fixed carbon. No. 2,386,592. Edward Canavan to Allied Chemical & Dye Corp.

Lubricant comprising soda soap, lead soap, organic halogen compound having low vapor pressure and resistant to thermal decomposition and hydrolysis, and sulfurized ester having general formula described in patent. No. 2,386,553. William Hilliker to Standard Oil Co.

Preparing a dry, neutral shellac salt of volatile alkali which comprises exposing shellac, in finely divided form, to moist vapor of volatile alkali until shellac salt of alkali is formed and then aerating salt to remove moisture and unreacted alkali. No. 2386,421. Henry Bassford, Jr. to U. S. Shellac Importers Association, Inc.

Liquid adhesive composition comprising polymerized chloroprene dispersed in solvent, said composition containing emulsified water, and chlorinated rubber as emulsifying agent for water. No. 2,386,403. Alexander Macdonald and James Rishton to B. B. Chemical Co.

Fiberizing unfiberized or partially fiberized crystalline masses of asbestos to produce asbestos fibers of a desired uniform fineness and without change in original natural length of fibers, which comprises: confining asbestos aggregates in closed zone together with gaseous medium chemically inert to asbestos under superatmospheric pressure to effect fiberization, releasing pressure suddenly to expel asbestos from closed zone into a zone of lower pressure to subdivide aggregates into fibers. No. 2,386,401. William Joyce, Jr. to Raybestos-Manhattan, Inc.

Insecticide comprising emulsion including external phase of hydrocarbon oil and internal phase containing in solution a compound selected from hydrofluoric acid, hydrofluosilicic acid; and mannide monooleate as a stabilizer of emulsion. No. 2,386,492. Menahem Merlub-Sobel to Virginia-Carolina Chemical Corp.

Composition for impregnating wood to reduce inflammability, comprising aqueous mixture containing compound selected from ammonium phosphate, borate and sulfamate, also containing a water-soluble copper salt. No. 2,386,471. Grinnell Jones and Walter Juda to Albi Chemical Corp.

Apparatus for producing fire extinguishing foam wherein is employed foam-conveying tube having entrance and discharge ends, etc. No. 2,386,464. Francis Hogenmiller to National Foam System, Inc.

Waterproofing normally non-water-repellent material which comprises treating with oily product obtained by hydrolyzing a methyldihalogenosilane of formula CH_3SiHX_2 wherein X represents chlorine or bromine. No. 2,386,259. Francis Norton to General Electric Co.

Producing modified oil which comprises blowing unsaturated organic compound selected from semi-drying oils, fats and waxes, and treating blown compound with acid of phosphorus, whereby a phosphato or phosphito group is attached to carbon through a carbon-oxygen-phosphorus linkage. No. 2,386,250. James McNally and Joseph Dickey to Eastman Kodak Co.

Preparing stable and anhydrous organosol composed of colloidal inorganic oxide and organic solvent. No. 2,386,247. Morris Marshall to Monsanto Chemical Co.

Lubricant comprising oil of lubricating viscosity and a reaction product of a phosphorous polysulphide and tri-isobutylene. No. 2,386,222. Bert Lincoln and Gordon Byrkit to Continental Oil Co.

Producing adhesives for bonding rubber to metal, which comprises forming solution of cyclized rubber derivative having same carbon to hydrogen ratio as rubber from which it was derived and having less chemical unsaturation than rubber, and incorporating sulphur. No. 2,386,213. Thomas Griffith to The Honorary Advisory Council for Scientific and Industrial Research.

Mineral oil composition comprising viscous mineral oil fraction having in admixture dithiophosphoric acid of an alkyl-substituted phenol. No. 2,386,207. Orland Reiff and Harry Andress, Jr. to Socony-Vacuum Oil Co. Inc.

Mineral oil composition comprising mineral oil fraction having in admixture, to stabilize oil against oxidation, compound characterized by presence of aromatic nucleus containing oil-solubilizing alkyl group, a thiophosphate ester group (—OPOS), and a group selected from thiolic acid group and a metal thiolate group (—COSX). No. 2,386,206. John Giammaria and Orland Reiff to Socony-Vacuum Oil Co. Inc.

Antifreeze in cooling systems of internal ombustion engines consisting of solution in ethylene glycol of ethylene glycol monoricinoleate free from soap. No. 2,386,183. Frederick Balcar to U. S. Industrial Chemicals, Inc.

Antifreeze in cooling systems of internal combustion engines consisting of solution in ethylene glycol of mixture of monoricinoleates of glycerol and glycol free from soap. No. 2,386,182. Frederick Balcar to U. S. Industrial Chemicals, Inc.

Manufacturing building blocks, curtain wall blocks, etc., which comprises mixing in cold state, soil and water containing inorganic metallic salt to form plastic mass, adding asphalt containing fatty acid to plastic mass and submitting mixture to pressure. No. 2,386,163. August Holmes and Joseph Roediger to Standard Catalytic Co.

Detergent composition for cleaning polished surfaces of glass, comprising 2-methyl-2, 4-pentane diol, commercial wetting agent of alkylated sulphonate type, and water. No. 2,386,106. Wilmer Gangloff to The Drackett Co.

Electrochemical polishing bath comprising sulfuric acid, lactic acid, phosphoric acid, and water. No. 2,386,078. Samuel Weisberg and Irvin Levin to Sealtest, Inc.

Making a glass cleaner and like, including treating kraft paper with aqueous solution containing glycerine and powdered silica. No. 2,386,-066. Raymond Schlabach.

Metallic conductor covered with electrically insulating layer containing resinous organo-silicon oxide composition which is insoluble and infusible and which comprises silicon atoms, oxygen atoms and alkyl and aryl radicals. No. 2,386,466. James Hyde to Corning Glass Works.

Dry rosin size composition for preparation of aqueous high free rosin size emulsions comprising neutral dry alkali metal saponified rosin size and a solid organic acid anhydride. No. 2,386,033. Fred Chappell, Jr. to Hercules Powder Co.

Lubricating oil composition comprising mineral lubricating oil having incorporated bi-di-iso-amyl thiol thiono carbamate to increase stability of lubricating oil against oxidation and sludge formation at crank case temperatures. No. 2,385,964. Daniel Bergen to Phillips Petroleum Co.

Composition for use as lubricant and as addition agent to improve characteristics of lubricating oils and greases, comprising a calcium-containing dual-metal compound of reaction product of a phosphorus sulfide and an oxygen-containing wax. No. 2,385,832. John Musselman to The Standard Oil Co.

Solidified normally liquid hydrocarbons. No. 2,385,818. Albert Laliberte to Safety-Fuel, Inc.

Solidifying normally liquid inflammable hydrocarbons which comprises reacting solution in said hydrocarbon of organic acid of fatty acids and rosin acids saponifiable to produce voluminous metallic soap gel from limitedly soluble to insoluble in said hydrocarbon, with a saponification agent of sodium hydroxide and sodium alcoholates, etc. No. 2,385,817. Albert Laliberte to Safety-Fuel Inc.

Siccative paint including organic film-forming material emulsified as dispersed phase in continuous aqueous phase including phosphoric acid, together with cation-active emulsifying agent; organic liquid blending agent from aliphatic alcohols, a solvent in dispersed phase, and a pigment unaffected by phosphoric acid. No. 2,385,800. Alfred Douty and Frank Freese to American Chemical Paint Co.

Making high free rosin size dispersion which comprises treating aqueous dispersion comprising saponified rosin, said rosin having been saponified by alkali metal alkali, with organic acid anhydride capable of hydrolyzing said saponified rosin. No. 2,385,794. Fred Chappell, Jr. to Hercules Powder Co.

Printing ink consisting of pigment dispersed in vehicle comprising aqueous dispersion of a trialkylol amine soap of talloil. No. 2,385,793. Everett Carman and Walther Reil to Interchemical Corp.

Abrasive article comprising abrasive grains and bonding agent comprising reaction product of a diolefine adduct of a conjugated unsaturated dibasic acid and member of polyhydric alcohols and polyalkylol amines. No. 2,385,776. Rupert Daniels and Anthony Mostello to Bakelite Corp.

Low temperature lubricant consisting of polyhydronaphthalene having dissolved therein extreme pressure agent. No. 2,387,170. John Morgan to Cities Service Oil Co.

* *Continued from Vol. 579, Nos. 1, 2, 3, 4.*

From Official Gazette—Vol. 579, No. 5—Vol. 580, Nos. 1, 2, 3 (Oct. 30-Nov. 20)—p. 641

Making cutting oil, which comprises reacting phosphorus pentasulphide with mineral oil, then incorporating long chain fatty acid ester to clear up residual phosphorus pentasulphide and subjecting to reaction temperature. No. 2,386,952. Everett Hughes to The Standard Oil Co.

Apparatus for producing fire extinguishing foam. No. 2,386,918. Lewis Timpson to Pyrene Development Corp.

Bitumen treating agent comprising (1) acylated polyamine and (2) an acylated polyamine. No. 2,386,867. James Johnson to Nostrip, Inc.

Solidifying normally liquid inflammable hydrocarbon. No. 2,386,805. Albert Laliberte to Safety-Fuel Inc.

Solidified normally liquid materials. No. 2,386,804. Albert Laliberte to Safety-Fuel Inc.

Stratified surface cleaner for cleaning hard materials, combination of: solvent comprising chlorinated hydrocarbons, detergent comprising vegetable oil soap, penetrant comprising tar acid oil, a coupling agent comprising normal butyl alcohol, anti-foaming agent comprising ethyl alcohol, a preservative comprising rosin, a blending and thinning agent comprising sodium bichromate, and water. No. 2,386,789. George Gregg to Bendix Aviation Corp.

Sheeted cellulosic material and abrasive article and process of making the same. No. 2,386,780. Bert Cross to Minnesota Mining & Manufacturing Co.

Insecticidal composition comprising product selected from extracts of pyrethrin- and rotenone-bearing plants and as added toxicant an amide having formula described in patent. No. 2,386,779. Gerald Coleman, Wesley Schroeder and Gerald Griess to The Dow Chemical Co.

Fatty article of predetermined form comprising compact body portion of disaggregated fatty material, and uniform fluid-impervious sheath of fatty material enveloping said body portion. No. 2,386,775. Martin Balzarini; one-fourth to Bennett Levenson.

Stable radiolucent paste comprising petrolatum and beeswax together with radiopaque substances to give paste having mass absorption coefficient for X-rays of predetermined wave-length. No. 2,387,704. Dan McLachlan, Jr. to American Cyanamid Co.

Hectograph blanket having gelatinous copy mass comprising gelatin, glycerine, alkali metal silicate, and invert sugar. No. 2,387,643. William Champion to Ditto, Inc.

Producing synthetic water soluble tanning materials, which comprises adding to waste liquor of sulfite cellulose, an acid which will form soluble calcium compounds therewith, adding compound selected from phenol, cresols, naphthols, etc., adding carbohydrate of starch and dextrin and then reacting mixture with aldehyde or ketone. No. 2,387,619. J. Seidel and Helmut Weber.

Composition for treating plant parts which includes wetting agent, adhesive agent and composition containing alkaline earth base and acid salt of quinoline. No. 2,387,591. Emile Kolb.

Detergent composition comprising alkyl aryl sulfonates, and water soluble salt having inorganic cation selected from water soluble sulfates, sulfites, thiosulfates, etc. No. 2,387,572. Lawrence Flett to Allied Chemical & Dye Corp.

Liquid heat exchange medium for regulating temperature of exothermic catalytic reactions consisting of isophorone to prevent decomposition of oil and steam cylinder oil which has lubricating effect on packings and stuffing boxes. No. 2,387,557. Ludwig Beer, Herbert Berg and Wolfgang Gruber.

Modifying mineral wax, comprising maintaining in vessel in molten condition composition including mineral wax, maintaining in same vessel subadjacent layer of molten sulfur, etc. No. 2,387,529. David Pearsall to The Ensign-Bickford Co.

Preparing cellular asphaltic insulation material which comprises mixing powdered hard asphalt with leavening agent comprising ammonium carbonate, molding mixture. No. 2,387,514. August Holmes to Standard Catalytic Co.

Phosphorescent tape comprising transparent base having on one side a thin, transparent layer of rubber, layer of luminescent pigment and another layer of rubber adhesive superposed over pigment layer. No. 2,387,512. Frank Hilberg to E. I. du Pont de Nemours & Co.

Patent leather comprising flexible base and coating comprising nitrocellulose film forming constituent, pigment, and a plasticizer, and having applied thereover, secondary coating of varnish or enamel, each of coatings including plasticizer comprising product of castor oil, maleic anhydride and diethylene glycol. No. 2,387,395. William Hedges, John Lowman and Thomas Kerr to Columbus Coated Fabrics Corp.

Pest control adhesive composition comprising water-insoluble aliphatic amine containing 8 carbon atoms in linear chain with amino group and a cationic dispersing agent. No. 2,387,336. Clarence Littler to E. I. du Pont de Nemours & Co.

*Textiles

Method of stretching filamentary material of continuous character. No. 2,385,894. Robert Taylor to American Viscose Corp.

Water-repellency imparting agent for textiles comprising substance chosen from salts and phenates of compounds having formula described in patent. No. 2,385,940. Donald Price and Rolston Bond to National Oil Products Co.

Conferring upon textile material softness and water-repellency, which comprises impregnating material with a quaternary ammonium salt of formula described in patent. No. 2,386,141. Maurice Rogers to Imperial Chemical Industries Ltd.

Improving surface characteristics of textile material, which comprises impregnating material with organic ammonium compound. No. 2,386,143. Maurice Rogers to Imperial Chemical Industries Ltd.

Textile yarn sizing composition of low viscosity and capable of drying on textile yarn to produce non-curling thereof and removable by scouring, consisting of solution in dilute aqueous ammonia of ammonia-soluble reaction product of hexahydric alcohol selected from mannitol and sorbitol, and unsaturated dicarboxylic acid selected from maleic acid, maleic anhydride and fumaric acid. No. 2,386,144. John Rust to Ellis-Foster Co.

Apparatus for producing artificial filaments comprising spinneret having spaced filament-forming orifices, etc. No. 2,386,173. Maurice Kulp, Frederick Morehead and Wayne Sisson and Wesley Webb to American Viscose Corp.

Treatment of artificial yarns, which comprises impregnating stretched yarns, foils and similar materials having basis of a lower aliphatic acid ester of cellulose with anhydrous medium containing cyclopentanone. No. 2,387,168. Robert Moncrieff and Charles Sammons to British Celanese Ltd.

Dyeing nitrogenous textile material which comprises running length of material in open width through aqueous bath in presence of selected dye, said bath being heated above 212° F., under pressure, and no further ageing being necessary. No. 2,387,200. Harold Walter to Uxbridge Worsted Co. Inc.

Textile fabric composed of intermingled, unorganized, textile fibers united by discrete de-esterfied cellulose ester bonds. No. 2,387,354. Raymond Reed to The Kendall Co.

Coated upholstery fabric material comprising fabric base having flexible coating consisting of evaporation residue of mixture consisting of nitrocellulose, plasticising resin consisting of condensation product of castor oil, maleic anhydride and glycol, and condensation product made up of castor oil, diethylene glycol and maleic anhydride, pigment and solvent. No. 2,387,396. William Hedges, John Lowman and Thomas Kerr to Columbus Coated Fabrics Corp.

Converting loose wool into finished fabric, which comprises impregnating loose wool with neutral and soap-free composite reagent consisting of saturated petroleum hydrocarbons and sulfonates of saturated petroleum hydrocarbons, sulfonates being present to render whole dispersible in water while unsulfonated hydrocarbons impart to mixture lubricating qualities. No. 2,387,510. Wallace Heintz and Walter Zillessen to E. I. du Pont de Nemours & Co.

*Water, Sewage, and Sanitation

Purifying waste water containing sodium chloride, calcium carbonate, calcium bicarbonate, iron salts, and bacteria, which comprises subjecting waste water to electrolysis, etc. No. 2,385,903. Samuel Winkelmann to The Texas Co.

Water softening and washing product and method of preparing same, which comprises heating mixture of crystalline trisodium phosphate and monosodium dihydrogen phosphate. No. 2,385,929. Leonard Meites.

Agricultural

Preparing directly from gluten a solution of zein-containing proteins in solvent having boiling point above 125° C. and having proportion of polar to non-polar radicals which lies within range extending between limits of proportion of polar to non-polar radicals of methanol and ethanol. No. 2,388,388. Roy Coleman to Time, Inc.

Preparation of zein solutions directly from gluten. No. 2,388,389. Roy Coleman to Time, Inc.

Accelerating formation of autogenously produced binders resulting from treatment of lignocellulosic materials under pressure at above 350° F., but short of carbonization of material, which comprises carrying out process in presence of ferric compound. No. 2,388,487. Harry Linzell to United States Gypsum Co.

Separating gluten from starch in wheat. No. 2,388,902. Robert Callaghan and Gerard Elverum to General Mills, Inc.

Making expander for storage battery plates which comprises partially neutralizing alkaline lignin containing solution derived from wood to alkalinity range from pH=7.0 to pH=10 etc. No. 2,389,465. Alexander Stewart and Adrian Pitrot to National Lead Co.

Biochemical

Effecting separation of amino acids containing plurality of nitrogen atoms in mixture, which comprises forming aqueous solution including salts of arginine and lysine with acid, etc. No. 2,387,824. Richard Block to C. M. Armstrong, Inc.

Reaction product of natural, high molecular, nitrogenous material as pathogenic agent, said nitrogenous material selected from poisons secreted by cold-blooded animals, bodies of microorganisms and endotoxins and exotoxins produced by microorganisms, with diazonium salt. No. 2,388,260. Ernest Friedheim.

Dehydrating biological material which comprises drying same by sublimation of moisture while in frozen state and under reduced pressure, and agitating frozen material while being dried to shake off dried material. No. 2,388,917. Jay Hormel to Geo. A. Hormel & Co.

Obtaining casein as firm curd from dried skim milk powder. No. 2,388,991. William Oatman to Hercules Powder Co.

Recovery of glycerol from carbohydrate fermentation still residues. No. 2,389,173. Robert Walmesley to Imperial Chemical Industries Ltd.

Improving physical characteristics of a protein mass which comprises alternately stretching and relaxing mass about 20 times while mass is under influence of a tanning agent. No. 2,389,292. Johan Bjorksten.

Ceramics

Construction for glass melting tanks. No. 2,387,880. George Campbell to Pittsburgh Plate Glass Co.

Making clay product as building block, roofing tile, sewer pipe and like comprising adding calcined pulverized perlite to clay, and adding mixture of cellulose and water. No. 2,388,060. William Hicks, one-third to John Gallois, and one-third to Harris Hammond.

Refractory having high strength at temperatures as high as 2650° F. and formed by firing together a batch, which consists of mixture of silicon carbide and alumina. No. 2,388,080. Frank Riddle to Champion Spark Plug Co.

Making of glass in glass melting furnace, which comprises feeding batch into furnace from a feeding point located at one side of furnace. No. 2,388,274. Aaron Lyle to Hartfor-Empire Co.

Removing isomorphous iron from cereamic raw materials comprising subjecting materials to vapor of carbon disulphide and thereafter to dilute acid. No. 2,388,302. Woldemar Weyl to American Optical Co.

Preparing clay for forming ceramic articles which comprises mixing with ceramic clay in presence of water, alkali, hydrocarbon oil and fatty acid. No. 2,388,446. Halver Straight.

Making ceramic articles which comprises forming wetting mixture by reacting alkaline water solution of a metallic silicate compound with a higher fatty acid which is soap forming, etc. No. 2,388,447. Halver Straight.

Preparing casts of gypsum plaster which comprises gaging with water a mixture of raw starch and gypsum plaster to form a mortar. No. 2,388,543. Gilbert Hoggatt to Certain-teed Products Corp.

Apparatus for simultaneous inspection of multiplicity of glass sheets or plates for defects such as ream, etc. No. 2,388,789. Leon Louviaux to Libbey-Owens-Ford Glass Co.

Additional patents on all other classifications from the above volumes will be given next month.

* *Continued from Vol. 579, Nos.* 1, 2, 3, 4.

Abstracts of Canadian Patents

Collected from Original Sources and Edited

Requests for further information or photostated copies of the patents reported below should be addressed to the Commissioner of Patents and Copyrights, Department Secretary of State, Ottawa, Canada.

CANADIAN PATENTS

Granted and Published Oct. 23, 1945

Two stage continuous flow process of isomerisation and alkylation of normal butane for production of higher molecular weight saturated hydrocarbons. No. 430,719. Eric Wm. Musther Fawcett, Gwilym Ialwyn Jenkins.

Production of branched chain hydrocarbons from normal paraffins employing treating feedstock at 50-200 Cent. in presence of anhydrous aluminum halide-hydrated aluminum halide catalyst containing silica gel. No. 430,762. Anglo-Iranian Oil Co. Ltd. (E. W. M. Fawcett, E. S. Narracott)

Vapour phase production of branch chain alkanes from normal alkane feedstock, by isomerization not above 132 Cent., and at one to 50 atmospheres pressure, employing aluminum halide catalyst. No. 430,763. Anglo-Iranian Oil Co. Ltd. (E. W. M. Fawcett)

Resinous reaction product of formaldehyde and (diamino s-triazinyl thio methyl) phenyl ketone. No. 430,772. Canadian General Electric Co. Ltd. (G. F. D'Alelio, J. W. Underwood)

Resinous reaction product of melamine, formaldehyde, and an alkyl ester of a bis-(diamino pyrimidyl thio) acetic acid. No. 430,773. Canadian General Electric Co. Ltd. (G. F. D'Alelio, J. W. Underwood)

Improving notch-bend resistance, flexibility, and raising softening point of polymerized ethylene by incorporation therein of rubber, gutta percha, isobutylene, or like materials. No. 430,775. Canadian Industries Ltd. (G. H. Latham)

Bonding cellulose derivative sheets by use of water-dimethyl formamide adhesive, and pressure. No. 430,776. Canadian Industries Ltd. (A. F. Wendler)

Aluminum silicate paint pigment composed of pyrophyllite calcined at 900 Cent. for about one hour. No. 430,777. Canadian Industries Ltd. (L. Balassa)

Anti-corrosion composition for protecting metal surfaces from the atmosphere containing oleyl acetone. No. 430,778. Canadian Industries Ltd. (R. F. Denington)

Obtaining provitamin D by extraction from mussels of the genus Modiolus. No. 430,779. Canadian Industries Ltd. (W. S. Calcott, J. Waddell)

Preparation of vinyl acetate and ethylidene diacetate by reacting acetylene and acetic acid in presence of 0.002 to 0.01 mol of a quaternary ammonium compound. No. 430,780. Canadian Industries Ltd. (F. O. Cockerville)

Copolymer of an alpha methylene monocarboxylic acid ester with 0.5 to 10 per cent by weight of a (2-vinylethinyl) carbinol. No. 430,782. Canadian Industries Ltd. (D. D. Coffman, C. E. Denoon)

Anti-static compound for coating films of non-hygroscopic, electrically-non-conducting material, composed of starch, 1 per cent; 0.5 per cent by weight of potassium acetate; and 0.5 per cent wetting agent, with remainder water. No. 430,783. Canadian Industries Ltd. (G. W. Brant)

High tenacity cellulose acetate cord for pneumatic tires. No. 430,852. Henry Dreyfus (T. Jackson, D. D. Finlayson, T. B. Frearson)

Granted and Published Oct. 30, 1945.

Manufacture of essentially pure opaque, white zinc aluminate pigment by heating zinc and aluminum compounds together at 750-1400 Cent. No. 430,866 (Louis E. Barton)

Method of making pure, white, hydrated lead aluminate pigment by heating lead oxide and aluminum hydrate at 725-880 Cent. No. 430,867. Louis E. Barton.

Preparation of stable, opaque, white lead aluminate pigment by heating silica-lead oxide-aluminum oxide mixture. No. 430,869. Louis E. Barton.

Thermoplastic container, re-inforced by means of high tensile strength coiled wire suitable for storage of gases under pressure. No. 430,870. Harry Davies.

Solubilizing and stabilizing an unstable and insoluble naphthoquinone without detracting from therapeutic properties by preparation of bisulphite derivative thereof. No. 430,891. Abbott Laboratories (M. B. Moore, F. J. Kirchmeyer)

Reclaiming lubricating oil used in the working of light metals by treatment with sulfuric acid to remove said metal inclusions. No. 430,893. Aluminum Co. of America (A. H. Riesmeyer)

Water insoluble sulphonated polymerizate of mixture containing divinyl benzene and vinyl naphthalene. No. 430,903. Canadian General Electric Co. Ltd. (G. F. D'Alelio)

Water-insoluble aminated polymerizate of mixture comprising divinyl benzene and styrene. No. 430,904. Canadian General Electric Co. Ltd. (G. F. D'Alelio)

Dehusking Carob beans by treating with phosphoric or sulphuric acids at above 40 Cent. to carbonize husks but not affect gum. No. 430,900. The Calico Printers Association Ltd. (L. A. Lantz, W. Roman)

Improved expander for storage battery plates composed of alkaline treated non-composted wood. No. 430,901. Canada Metal Co. Ltd. (A. Stewart, A. H. Pitrot)

High pressure resistant storage vessel design. No. 430,923. Imperial Chemical Industries Ltd. (Harold Birchall)

Softening and swelling spongy rubber by treatment with aqueous emusion of mineral oil. No. 430,960. U. S. Rubber Co. (Donald R. Kemble)

Granted and Published Nov. 6, 1945

Hardenable condensation products of high electrical insulation value derived from m-cresol and formaldehyde the phenolic hydroxyl groups of which are etherified in an alkaline medium to at least 25 per cent. No. 431,003. Hans Stager.

Capacitor impregnants of high dielectric strength consisting of three parts orthonitro tetrachlor diphenyl and one part of unchlorinated nitrated diphenyl. No. 431,021. Canadian General Electric Co. Ltd. (F. M. Clark)

Dielectric compositions consisting of chlorinated diphenyl and one percent alpha nitronaphthalene. No. 431,023. Canadian General Electric Co. Ltd. (Frank M. Clark)

Thermal reduction process for production of magnesium by heating briquettes of magnesia and ferrosilicon with ratio of magnesia to silicon of 1 to 0.160 and 1.0 to 0.189. No. 431,028. Dominion Magnesium Ltd. (L. V. Whiton, H. McL. Weld)

Addition agent for treating molten iron consisting of titanium, zirconium, vanadium and columbium totalling at least 35 per cent, and beryllium and boron totalling not less than 5 per cent. No. 431,031. Electro Metallurgical Co. of Canada Ltd. (Walter Crafts)

Liquid phase catalytic hydrogenation of acetone involving the improvement of effecting hydrogenation in reaction mixture containing 0.0003 moles of an alkali metal isopropylate per mole of acetone. No. 431,045. Joseph Blumenfeld.

Waterproof fabric, suitable for flexible adhesive tape backing, coating containing 50 pounds cellulose acetate, 88 pounds of methyl phthallyl ethyl glycolate, and 35 pounds of inert materials. No. 431,051. Johnson & Johnson Ltd. (F. N. Manley, E. P. Wenzelberger)

Antioxidant tar distillate prepared by destructively distilling under a partial vacuum and below 350 Cent. a wood-free, ethanol redwood extract containing water insoluble phlobaphenes and water soluble tannins and related phlobaphenes. No. 431,058. The Pacific Lumber Co. (H. F. Lewis)

Chewing gum base comprising tasteless, odourless polyvinyl ester, non-toxic plasticizer, finely divided mineral filler, and oleaginous substance adapted to prevent separation between the filler and the ester. No. 431,103. Shawinigan Chemicals Ltd. (Geo. J. Manson)

Textile fabric, water-buoyant cylinders, impregnated with water resistant polymer. No. 431,111. Henry Dreyfus.

Dyestuff of the phthalocyanine series. No. 431,116. Berthold Beinert, Herman Thielert.

Phthalocyanine dyestuff. No. 431,117. Berthold Bienert, Herman Thielert.

Granted and Published Nov. 13, 1945

Purification of vegetable pigment such as chlorophyll by means of bone meal. No. 431,137. Thos. B. Mann.

Blood plasma substitute consisting of polyvinyl alcohol—sodium chloride solution. No. 431,144. Norman W. Roome.

Production of 1,3 butylene glycol by catalytic dehydration of 1,3 butadiene at 220-350 Cent. No. 431,156. Air Reduction Co. Inc. (Arthur E. Lorch)

Triazole derivatives, 1-carbamyl guanazole and 1-guanyl guanazole. No. 431,167. Canadian General Electric Co. Ltd. (G. F. D'Alelio)

Process for preparation of cyclammonium quaternary salts. No. 431,172. Canadian Kodak Co. Ltd. (L. G. S. Brooker)

Preparation of polymethine dye intermediate by condensing a mercaptan with a cyclammonium quaternary salt containing a halogeno-vinyl group. No. 431,173. Canadian Kodak Co. Ltd. (L. G. S. Brooker, G. H. Keyes)

Heat stable polyvinyl chloride-acetate resin stabilized with 0.5 to 5.0 per cent by weight of triphenyl tin hydroxide. No. 431,213. Carbide and Carbon Chemicals Ltd. (Victor Ymgve)

Method of manufacturing molded, colored, plastic heel. No. 431,215. B. B. Chemical Co. of Canada Ltd. (T. F. Morris)

Production of extruded viscose threads by extrusion into coagulating bath of sulfuric acid and at least one metallic salt in the presence of a non-ionogenic water-soluble which is reaction product of ethylene oxide and aliphatic alcohol or acid of at least 8 carbon atoms in chain. No. 431,217. Courtauldts Ltd. (John Wharton)

Production of lustrous polyvinyl alcohol threads by dissolving the alcohol in water and extruding into hydroxy-ethoxy-ethyl ether to remove water, and drying. No. 431,218. Courtaulds Ltd. (D. L. Wilson)

As new compound benzothiazyl sulfur chloride, and method of preparation. No. 431,226. Dominion Rubber Co. Ltd. (W. E. Messer)

Rubber accelerator composed of tetra butyl thiuram monosulphide, a butyl thiourea and a butyl urea. No. 431,227. Dominion Rubber Co. Ltd. (A. J. Laliberte)

Reduction of deterioration of rubber due to flexing by incorporation of 2,5-dihydroxy biphenyl in vulcanizable compositions. No. 431,229. Dominion Rubber Co. Ltd. (R. T. Armstrong, E. J. Hart)

Manufacture of ammonium dithiocarbamate by reacting carbon disulphide and ammonia in mixed solvent of isopropyl alcohol and isopropyl ether at 0 to 35 Cent. No. 431,230. Dominion Rubber Co. Ltd. (S. D. Shinkle)

Monoazo dyestuff. No. 431,234. J. R. Geigy A. G. (A. Krebser, W. Bossard, W. Kuster)

Metallizable dyestuff. No. 431,235. J. R. Geigy A. G. (Ernst Keller)

Diazo and polyazo dystuff. No. 431,268. Society of Chemical Industry In Basle (Jakob Brassel)

Transformer oil consisting of mineral oil and addition of few hundredths to few tenths of one per cent of di-iso-amyl tartrate. No. 431,274. Union Oil Co. of California (Earl Amott)

Trademarks of the Month

A Checklist of Chemical and Chemical Specialties Trademarks

417,589. Grand Rapids Varnish Co., Grand Rapids, Mich.; filed June 2, 1945; Serial No. 484,091; for synthetic resin varnish; since Dec. 31, 1930.

417,797. Mac-O-Lac Paint & Varnish Works, Detroit, Mich.; filed Mar. 26, 1945; Serial No. 481,330; for ready-mixed paints; since 1940.

417,802. Ellis J. Hofford, as Hofford Paint & Varnish Co., Carlstadt, N. J.; filed Apr. 28, 1945; Serial No. 482,746; for shellac-like coating material; since September 1944.

417,804. Maas & Waldstein Co., Newark, N. J.; filed May 14, 1945; Serial No. 483,329; for coating compositions—fungus resistant wax concentrate; since Mar. 15, 1944.

417,977. American Cyanamid & Chemical Corp., N. Y.; filed Feb. 5, 1945; Serial No. 479,408; for apparatus for demineralization of liquids and gases; since Aug. 20, 1943.

475,463. Refined Products Co., Lyndhurst, N. J.; filed Oct. 18, 1944; for detergent as dyeing assistant; since June 1, 1939.

476,531. Stanco Inc., N. Y.; filed Nov. 16, 1944; for white mineral oil; since May 18, 1944.

480,199. L. Sonneborn Sons, Inc., N. Y.; filed Feb. 24, 1945; for insecticidal cattle spray; since 1920.

480,211. L. Sonneborn Sons, Inc., N. Y.; filed Feb. 24, 1945; for varnishes; since 1920.

480,261. Witco Chemical Co., Chicago, Ill.; filed Feb. 26, 1945; for polymerized vegetable oil as rubber substitute; since March 1942.

480,455. Hercules Powder Co., Wilmington, Del.; filed Mar. 3, 1945; for resin emulsions in textile finishing; since Oct. 23, 1944.

480,481. Union-Baystate Co. Inc., Cambridge, Mass.; filed Mar. 3, 1945; for synthetic rubber cement; since Jan. 26, 1945.

482,053. E. I. du Pont de Nemours & Co., Wilmington, Del.; filed Apr. 12, 1945; for dimethylolurea; since July 29, 1941.

482,866. The John P. Cochran Co., Cleveland, Ohio; filed May 2, 1945; for ready-mixed paints; since Apr. 21, 1945.

482,897. Sofna Products, Inc., N. Y.; filed May 2, 1945; for emulsifying detergent; since Apr. 4, 1945.

483,115. S. Oppenheim, Inc., N. Y.; filed May 8, 1945; for dry, resin emulsion paints; since May 1, 1941.

483,328. B. LaPorte Ltd., Luton, Bedfordshire, England; filed May 14, 1945; for chemicals; since Mar. 9, 1917.

483,336. Pennsylvania Salt Mfg. Co., Philadelphia, Pa.; filed May 14, 1945; for agricultural chemicals; since Apr. 27, 1945.

483,523. G. E. Specialty Co., Brooklyn, N. Y.; filed May 18, 1945; for floor wax; since March 1944.

484,037. Shell Union Oil Corp., San Francisco, Calif.; filed May 31, 1945; for ammonia for soil fertilizing; since Feb. 10, 1945.

484,170. Haas-Miller Corp., Philadelphia, Pa.; filed June 5, 1945; for softening and hygroscopic agent; since May 3, 1945.

484,248. Consolidated Exterminators, Inc., N. Y.; filed June 7, 1945; for insecticides; since Feb. 15, 1944.

484,313. Monsanto Chemical Co., St. Louis, Mo.; filed June 8, 1945; for solvent; since about May 29, 1945.

484,534. William J. Lenz, as Lenz Testing Labs., Louisville, Ky.; filed June 14, 1945; for energizing preparation to be added to fuels; since May 1945.

484,852. Monsanto Chemical Co., St. Louis, Mo.; filed Jan. 21, 1945; for synthetic resin coating compositions; since May 11, 1945.

484,912. The Sherwin-Williams Co., Cleveland, Ohio; filed June 22, 1945; for insecticides and fungicides; since Mar. 1, 1945.

484,983. L. Sonneborn Sons, Inc., N. Y.; filed June 23, 1945; for petroleum sulfonates; since Mar. 10, 1943.

484,996. Ashcraft-Wilkinson Co., Atlanta, Ga.; filed June 25, 1945; for ammonium nitrate fertilizers; since July 12, 1943.

485,230. Marathon Corp., Rothschild, Wis.; filed June 29, 1945; for dispersing agents consisting of lignin sulphonic acid compounds; since June 13, 1945.

485,282. Walter Kidde & Co. Inc., N. Y., and Belleville, N. J.; filed June 30, 1945; for carbon dioxide and oxygen; since Oct. 10, 1941.

485,394. Applied Chemical Corp., N. Y.; filed July 3, 1945; for aluminum acetate; since Apr. 1, 1945.

485,398. California Spray-Chemical Corp., Wilmington, Del.; filed July 3, 1945; for parasiticides and insecticides; since June 5, 1945.

485,435. Charles Bruning Co. Inc., N. Y.; filed July 4, 1945; for developing materials for sensitized papers; since Apr. 9, 1943.

485,444. Hercules Powder Co., Wilmington, Del.; filed July 4, 1945; for insecticides; since Feb. 14, 1945.

485,456. L. Sonneborn Sons, Inc., N. Y.; filed July 4, 1945; for liquid softener for coning rayon yarns; since Dec. 13, 1933.

485,461. L. Sonneborn Sons, Inc., N. Y.; filed July 4, 1945; for leveling agent; since January 1917.

485,488. Atlas Powder Co., Wilmington, Del.; filed July 6, 1945; for lacquers and stains; since Feb. 1, 1923.

485,490. Eastman Kodak Co., Flemington, N. J., and Rochester, N. Y.; filed July 6, 1945; for photographic chemicals; since June 2, 1945.

485,666. Standard Oil Co. of California, Wilmington, Del., and San Francisco, Calif.; filed July 10, 1945; for lubricating oils and greases; since June 12, 1945.

485,675. American Cyanamid & Chemical Corp., N. Y.; filed July 11, 1945; for tannin and organic colloid used as well drilling muds; since May 22, 1945.

485,751. Central Petroleum Co., Cleveland, Ohio; filed July 13, 1945; for lubricating oils and greases; since Oct. 1, 1924.

485,878. Monsanto Chemical Co., St. Louis, Mo.; filed July 16, 1945; for calcium phosphates for leavening purposes; since Aug. 13, 1942.

486,214. John McQuade & Co. Inc., N. Y.; filed July 24, 1945; for paint thinners; since July 1, 1941.

486,529. International Lubricant Corp., New Orleans, La.; filed July 31, 1945; for lubricating oils and greases; since Mar. 1, 1937.

486,951. International Lubricant Corp., New Orleans, La.; filed Aug. 9, 1945; for lubricating oils and greases; since Mar. 1, 1937.

487,132. Humble Oil & Refining Co., Houston, Tex.; filed Aug. 14, 1945; for cutting oils; since June 26, 1945.

Trademarks reproduced and described include those appearing in the Official Gazette of the U. S. Patent Office, October 30 to November 20, 1945.

WAT-R-SEAL
417,589

SONOSPAR
480,211

CROSSED KEYS BRAND
483,328

LENZITE
484,534

DAT
485,398

AEROSEAL
485,675

FADELESS REALWHITE
417,797

WITCOGUM
480,261

SKYLAC
484,852

COPYFLEX
485,435

CENOLCO
485,751

HOFFORD'S DURA PLASTIC
417,802

DRESINOL
480,455

Dee-D-Teen
483,336

DAY-LITE DUST
484,912

THANISOL
485,444

X-C
485,878

FUNGI SHIELD
417,804

CHLOR-ISOPOL
480,481

PLAST-O-WAX
483,523

LACTONATE
484,983

RAYCONOL
485,456

REDUSOL
486,214

DU PONT
482,053

NITROJECTION AMMONIA
484,037

NITRAPRILLS
484,996

SONOLENE
485,461

FILT-R-STIL
417,977

MADE BETTER LASTS LONGER
482,866

AQUATAIN
484,170

MARASPERSE
485,230

AQUANITE
485,488

INTERNATIONAL LUBRICATION
486,529

PERMA TERGE
475,463

CONSOLIDATED EXTERMINATORS
484,248

K
485,282

MICRODOL
485,490

IMOL
476,531

SOFNALENE
482,897

GVL
484,313

Alacet
485,394

INTERNATIONAL
486,951

COMFORTOL
480,199

SANOLITE
483,115

485,666

BUR-BAN
487,132

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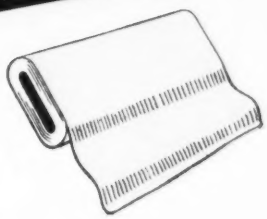
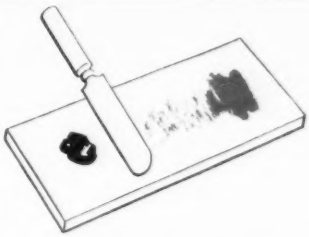
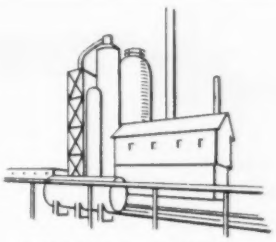
New Product?



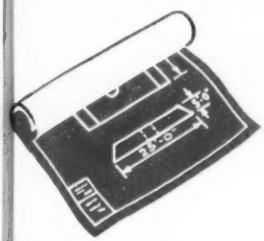
Textile Processing



For Color Lakes and Pigments

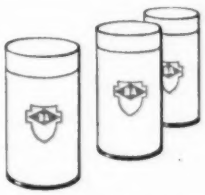


In Catalysts for Oil Refining

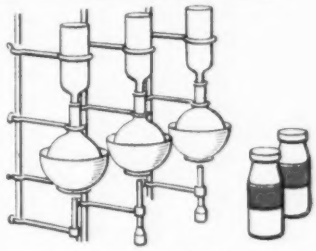


Sizing Special Papers

Leather Tanning



Raw Material for Other Industrial Chemicals



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